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ABSTRACT

Existing adaptive devices do not give blind persons full access to today's word processors or the personal computers (PCs) replacing them. Therefore, a study examined information concerning the technological and training imperatives that must be addressed in order to allow blind individuals complete access to the field of word processing. Because word processing systems are highly proprietary, it is not prudent to develop adaptive devices for specific, dedicated word processors. Rather, efforts should be concentrated on developing adaptive devices to be attached to PCs capable of running applications programs that can generate sharable files. Hardware and supporting software must be developed to facilitate sharing of files along the following avenues: across phone lines, between different operating systems, between different applications programs, and between systems in which both the operating systems and applications programs differ. At present, only a handful of rehabilitation agencies across the country are training blind people to use the types of hardware for which file sharing is available. Blind persons must receive more and better training in the areas of using adaptive aids sharing files; should be given the opportunity to gain proficiency on a given device prior to employment; and, once on the job, should be allowed to perform more than one task, not just word processing. (MN)

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Topic 1: Technology and Vocational Training and Placement

Title: IMPROVING TECHNOLOGY, TRAINING, AND OPPORTUNITIES FOR BLIND PEOPLE IN WORD PROCESSING

Technical Abstract/Summary:
Although word processing jobs will double in the next three years at 40% of the Fortune 1350 companies who are frequent employers of blind people, blind typists are having severe problems just holding current positions. Existing adaptive devices don't fully access either today's word processing systems or the PCs replacing them. The blind person needs a device which creates disk files other typists can access to make revisions using different systems. This typist also needs tools and training to do multiple new tasks brought on by the advent of the PC.

With this technological gap, training centers for the blind are unable to train students to full competency on any one device. Worse yet, their graduates' employment options are limited. They must seek employers who use systems for which they've trained.

This project studies employment realities, technological options, and training programs to identify ways to mainstream blind word processing operators better. The goal is a product concept which revolves around simplified training as a primary objective, not an afterthought.

Keywords: Word processing, blind, training, file sharing, adaptive devices

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## PURPOSE OF THE RESEARCH

Word processing is becoming an increasingly endangered vocational direction for blind people as contemporary systems outdistance adaptive solutions. Some meaningful tools for blind typists like the Audio Typing Unit and Computer Viewing System (CCTV) have been discontinued.

The majority of emerging adaptations are piecemeal solutions which don't prepare the blind word-processing operator for the plethora of machine and employer environments. Stand-alone word-processing systems for the blind don't share disk files with employer's other machines, with the result that blind typists must ask supervisors or others in the word-processing pool to dictate or make required changes. Such a request represents excessive job modification for many employers. This is a major employment barrier.

Some distressing trends are evident. There are increasing reports of jobs lost as new technology replaces old. At the same time, word processing is a growing field. In a market study shared with us by a major company, 42% of the Fortune 1350 companies responding expected word processing jobs to double in the next 3 years, with companies having over 150 keyboards expecting 50 more in that period. There will be an estimated 5.4 million word-processing jobs by then. Some vocational training agencies recognize this growth opportunity, but they have generally placed word-processing training programs for the blind on hold, recognizing technological obstacles.

Existing word-processing training centers report a reduction of skill levels among applicants, as capable people opt for other positions. (To be competitive, the blind typist historically has had to be better than average in typing first-time drafts, given an inability to undertake some other aspects of the job.) Many of these previously over-qualified blind applicants are now entering programming and other data-processing fields. Not as capable, their successors with more moderate skills need systems that are better attuned to their skills (which is why our Phase I findings lead us to conceive of a new family of devices).

In proposing this project, we asserted that job opportunities for blind people in word processing will improve significantly if blind typists are "competitive operators" (see next paragraphs) and are able to share disk files with employers' other systems. Sharing files minimizes disruption

in the normal flow of work. It requires fewer of the job modifications that a naive, fearful, or unaccommodating employer views as excessive.

At TSI, we've observed that employers' perceptions of blind employees' performance with current, limited technology is a major barrier and a reason for both reduced employment opportunities and job displacement. We want to design systems which allow blind operators to be competitive and at maximum performance with the device they bring to the job (or encounter at the job, if they are lucky enough to be trained for the same system).

Over the last few years, applicants are increasingly less competitive at the time they approach employers. The "competitive operator" must use the employers' word-processing system as a word-processing system, not as a typewriter.

So the goal of our study is to conceive of word-processing technology for blind people that fits more successfully in the employment environment. That technology must be sufficiently universal -- fitting a significant percentage of employment settings and offering a range of output modalities -- so that training centers can prepare people cost-effectively. Centers can only do this if they're confident that they're training people on a device that will be in demand because it's widely useable.

Training must be simpler, and at more, less-specialized locations. There must be training programs for trainers so they're able to do more than just train typists, so they prepare students for a competitive environment.

## PROJECT OBJECTIVES

Because we assumed that better technology would improve word processing training possibilities (and, thus, improve employment opportunities), we studied technological imperatives and training imperatives in parallel. We merged the findings in Objectives 4 and 5.

Objective 1: Select representative devices for interfacing studies.

Objective 2: Gain sophisticated awareness of selected word-processing systems (including file structures, interface protocols, software and hardware architecture).

Objective 3: Identify existing software and hardware (for protocol conversion, LAN access, etc.) relevant to five investigation options:

a. Direct connection
b. Disk sharing
c. Uploading
d. Use of protocol converters
e. Local area networks

Objective 4: Report the relative merits of the five options listed in Objective 3.

Objective 5: Identify design criteria for developing improved word-processing training courses for the blind.

## ACTIVITIES AND FINDINGS

Our goal was to see if adaptive devices with improved file-sharing capabilities would lead to some standardization of word-processing equipment blind people needed, and therefore, to some standardization in the way people might be trained and be competitive.

We began by selecting a half dozen of the most dominant word-processing systems. We selected IBM dedicated systems and PCs, Wang dedicated systems and PCs, Lanier dedicated systems, Xerox 860, NBI, and Vydec. The first two were obvious choices. A survey conducted by the International Word Processing Association indicates that 90 percent of the Fortune 1350 companies (which are among the most likely to hire blind people) have IBM equipment. Eighty percent have Wang.

New devices should result from employer requirements, training organizations' needs, and an undercurrent of technological reality. Those were the three areas we studied.

### Employment Requirements:

There is a major, distressing trend toward decentralized word processing and fewer "transcribing-only" jobs. For example, at a regional office for AT&T Communications, the word processing pool of 7 operators supports 1100 people and does not have enough dial-in dictation to keep one transcriptionist busy. Del Monte and Chevron confirm the same trend. Typing is now being done less and less in central pools. Executives are drafting their own memos on PCs, and departmental secretaries are typing the rest, generally from hand-written drafts. Administrators at the AT&T Regional Office could not think of even one dictating machine in the building.

Typists are now expected to perform a myriad of other traditional tasks to be competitive. For example, Chevron has Xerox word-processing equipment worldwide, but a mixture of personal computers (PCs) in addition. The Xerox systems and the PC's are tied together with Ethernet and/or modems so that the word-processing information is sent internally via electronic mail. The ability to handle such mail transfers is a standard requirement which would be imposed on any blind typist.

Reports from the Laney Junior College Word-Processing Training Center and Sensory Aids Foundation further confirmed that there are fewer 100-percent transcription jobs available. Banks and insurance companies are still the major employers for centralized word processing, but many of them are using primitive systems. Sighted word processing graduates are apparently very easy to place.

A Xerox marketing representative confirmed the trend from typing pools where blind, first-draft specialists might thrive. Discussing word-processing pools or centers, she said the cycle is back to stand-alone systems that are perhaps networked instead of centers which have terminals accessing the same host processor (as was more prevalent in the mid-70's). The center concept is still valid in many law firms, but the last 4-5 years have seen tremendous decentralization in most places requiring significant word processing.

Employer statements and published reports show that a trend toward PCs accounts for much of the trend toward decentralized word processing. This decentralization is reportedly due to changes in the work environment requiring manipulation of multiple tasks (not just word processing), faster turnaround times, and more-immediate feedback.

According to John Kiefer, Vice President of Research for Yates Ventures, Inc. in Palo Alto, "The market has shifted from 58 percent in 1979 for dedicated word-processing systems to about 12 percent today." He notes that currently 65 percent of all personal computers sold come equipped with word-processing software. Forty-eight percent of all micro-computers are employed in some word-processing functions.

Kiefer predicts that by 1989, dedicated systems will be a thing of the past.

Confirming that trend is Telex's decision regarding recently-acquired Lexitron. Lexitron has manufactured a dedicated system which has been a major name in the field. A product manager at Lexitron reports that the Lexitrons that have already been produced will be stored and sold, but no more will be manufactured. In the future, software will be developed so that the Telex 1186 Intelligent Workstation will work like the Lexitron and share files. The 1186 is a PC-type compatible. It has a 16-byte micro-processor, reads and stores disk files, and runs DOS and Lotus.

It appears clear that for the blind person to be competitive doing word processing or text entry in an environment which

is increasingly PC-dominated, he/she must be able to access and control additional applications (beyond simple word-processing). Each of these applications adds complexity, so the adaptive device providing access to the PC must be extremely simple to learn and operate. Precious training time must be reserved for learning applications programs, not the adaptive tool.

Where the PCs don't dominate, there are two additional equipment trends which challenge the access tools required by the blind word-processing operator. According to a Data Pro report on word processing, the likes of IBM and DEC are offering top-down solutions inter-connecting stand-alone devices to larger systems provide ever-wider functions. Conversely, dedicated word-processing vendors are attempting bottom-up solutions to upgrade and network product families to stay on board for the fierce scramble for office automation dollars.

Data Pro also reports "demand for low-end stand-alone typing stations is still robust." This includes systems like Xerox 640 Memorywriter and IBM's Selectric System/2000. Neither of these generate disks or offer the possibility of file sharing for subsequent editing. So although these devices do not challenge the blind employee with new, unfamiliar tasks like electronic mail transfer, neither do they allow their user to mainstream through file sharing.

Multi-tasking will be increasingly important and is apparently responsible for the increasing preference for PCs. Word processing and data processing are merging, which means that additional skills in electronic communications will become an important part of word-processing operator training.

Software offerings make the trend toward multi-tasking obvious. Most successful vendors offer compatible word processing, spreadsheet, and communications packages. For examples, IBM has offered the Assistant Series (produced by PFS Write) with the claim-to-fame that files from Filing Assistant, reports from Reporting Assistant, graphs from Graphing Assistant, spreadsheets from Planning Assistant, and text from Writing Assistant can all be merged in the same document. Lotus, the famed spreadsheet program, has evolved into Symphony which includes word-processing capability.

Windowing programs like APX Core (Appendix A) are emerging to allow multi-tasking by dividing the memory of a PC and run up to eight unrelated applications programs at once.

Sidekick (Appendix B) and PolyWindows (Appendix C) offer calendars, calculators, and various features associated more with a secretary's desk than a traditional word-processing operator's console. People doing word processing will increasingly need access to this varied information.

AT&T offers an example of employees who are widely networked to do multiple tasks. Executives have personal computers or terminals at their desks, and not only transfer mail electronically, but maintain central appointment calendars and electronic bulletin boards. Their secretaries who do much of their typing are expected to access and manipulate the same information.

So the needs for multi-tasking and on-site typing clearly underride the trend toward PCs for word processing. Perhaps the clearest proof of the trend to PCs is IBM's recent and long-awaited announcement committing to support the PC in networks with IBM's other mainframe and mini-computers. IBM has now committed to add the formerly-orphaned PC to its "family." (Appendix D.)

IBM's Attachment Series is further evidence that the PC is to be mainstreamed into traditional word-processing applications occupied by larger machines and peripheral terminals.

## Technical Issues:

It is not feasible to develop adaptive devices for specific, dedicated word processors. The systems themselves each have unique operating systems which are highly proprietary, so much so that TSI had to sign non-disclosure agreements to learn about two of them. And demand is not sufficient, even for the most popular, to warrant the development costs of a device-specific adaptation.

Instead, it appears prudent to design word processing systems for the blind---either dedicated or PC-based systems---which can share files with employers extant systems. Those systems must either generate files with structures identical to the employer's applications programs, or the resulting files must be convertible via hardware and/or software into a sharable form.

The first option---a dedicated device for the blind which generates internal files with structures identical to those from the employer's applications program---is feasible, but not desirable. Even if you can decide upon which application program format to emulate, the result would be inappropriate

and inadequate for the blind user. For example, a blind person would know a line is centered after reading a ".ce" (center the line) command on a dedicated system designed specifically for him/her. But if that system were instead imitating DisplayWrite 2 and actually centering text on a full screen, there would be no such certainty.

Thus, we are left with the second option of attaching adaptive devices to PCs running applications programs which generate shareable files.

It is challenging to determine just what constitutes a received "shared file" which is adequate for the purpose of doing subsequent revisions on a second device. The International Standards Organization describes a seven-layered model of data communications. This model attempts to separate the multitude of rules and conventions of communications into specific "slots" or layers where the rules logically fit. The layers progress from the most primitive requirement---a successful physical linkage---to more complex layers. (This is like a computer's version of Maslow's Needs Hierarchy.)

The layers are:

1. Physical link.....can be a phone line or coaxial cable.
2. Data-link.....rules for framing data into understandable blocks.
3. Network control layer.....routes messages, like an auto-dial modem.
4. Transport layer.....allows reliable transmission of data once connection is established.
5. Session-control layer.....handles the interaction between the operating system of the computers that are communicating and the services that are being provided by the transport layer of the communication system.
6. Presentation layer.....governs how the data should look to the receiving and transmitting computer and translates the codes from the format of one to the format of the other.
7. Applications layer.....supports user applications such as spread-sheets on the personal computer or 3270 sessions on a mainframe.

Layers 1-5 provide the basics of communication and are easily provided. Layers 6 and 7 are the layers that cause the divergence in the types of micro-to-mainframe linking file-sharing and emulation programs that are now being introduced.

When the blind word-processing operator is fully trained to use a Brand X word-processing system (via adaptive techniques and technology) and enters a different machine environment, he/she usually encounters file-sharing challenges which, involve layers 5-7, above.

The most likely file-sharing considerations are:

1. Sharing **across phone lines** (or, equivalently, via hard-wired direct connection and null modem). Text is transmitted, but not control characters for format commands like underlining or tabs.

2. Sharing **between different operating systems.** Here, perhaps files are generated and revised using the same applications program (like WordStar) in each of two different computers, but those two computers (example: Brand X and Osborne) have different operating systems (MS-DOS and CP/M).

3. Sharing **between different applications programs.** Files are written on computers with identical operating systems (for example, an IBM PC and an IBM PC look-alike, both using PC-DOS) using different application programs (for example WordStar and DisplayWrite 2). The files need to be shared without losing the format control capabilities conveyed via control characters.

4. Sharing when **both the operating systems and the applications programs differ.** Files are written on dissimilar operating systems with dissimilar word-processing programs.

**Across phone lines...**
For the blind word processing operator, meaningful file sharing via telephone transfer (1, above) is improbable. Generally, only image files (see next paragraph) are transferred, and because essential control characters are stripped during transmission, the receiving device gets none of the essential format commands. So a tedious job called "cleanup" is required before any "real work" can begin.

Word-processing systems can generate and transfer both image files and text files. An image file includes hard carriage returns on every line and would, for example, insert five spaces at the beginning of an indentation rather than a control character which might be interpreted by the

applications program at time of printout as a new paragraph and turned into five spaces. The alternative text file includes control characters unique to a specific applications program. For example, WordStar might use a different control character to generate indentation than DisplayWrite 2 does. But both use a control character in their text files rather than inserting spaces.

Because image files do not contain any control characters unique to applications programs, the tendency is to think that these are the types of files the blind typist should deal with and transmit or receive from other systems, perhaps doing something easy like phone transfers. But a transferred image file cannot be subsequently modified with any significant capability. For example, a word-processing program like IBM's Writing Assistant allows one to automatically generate page numbers as "footers." If a text file generated with Writing Assistant is reloaded into Writing Assistant for further editing, insertions on page 1 push subsequent text to page 2, but the page numbering footer still remains intact on page 1.

If, instead, an image file of that text (containing only text, spaces, carriage returns, and linefeeds) was loaded into Writing Assistant for editing, an insertion on page 1 would force the page numbering footer "image" onto page 2, an inappropriate location.

Similarly, if one is trying to manipulate received image files, tab capabilities are missing. The receiving applications program simply can't recognize where tab markers are located, because tabs have been replaced by hard spaces in the image file.

So, image files are nice for transferring text between dissimilar systems, often across telephone lines, but the receiving device generally cannot meaningfully manipulate the resulting data.

**Between different operating systems...**
There are many programs which do disk-format conversions from one operating system format to another (2, page 10). Appendices E,F,G, and H show examples of systems that can convert between up to 85 different mainframe, micro- and mini-operating system formats. The resulting transferred files can only be manipulated successfully on the receiving end if both the transmitting and receiving machine were using the same applications program. In other words, disk copying which only does operating system conversions only solves

operating-system incompatibilities. Programs like BLAST, Xenocopy, and Uniform (Appendices F, G, H) do not deal with text-file conversion problems.

Unfortunately, disk format conversion is not a significant file sharing solution for the blind person entering an environment of dedicated word processing machines. The problem is seldom as simple as merely solving incompatibility between the Brand X system and the office's system. The applications programs are often dissimilar, and that's a much more serious obstacle.

Such was the case with Versatext, the TSI braille word processing system which triggered our interest in file sharing in the first place. Versatext uses a variation of CP/M. If the only incompatibility between VersaText files and an employer's files was a difference in operating systems, file sharing could be arranged with fairly simple disk reformatting programs. But the internal file structure of VersaText is very specific to braille and no one will ever find it commercially appealing to develop software to convert VersaText files into applications program files (like DisplayWrite 2) for editing purposes.

**Between different application programs...**
File sharing between dissimilar application programs (3, page 10) like Wang and IBM 5520 word processing is a major and complex problem. To be a completely successful text-file transfer between dissimilar programs, the received file must appear to the receiving system (e.g., IBM 5520) as if it were generated there. In other words, if the file written on the Wang system included tabs (i.e., control characters which Wang systems interpret as tabs) and the IBM 5520 program uses a different control character to indicate a tab location, the file transfer will be successful only if striking the tab key on the destination 5520 will move the cursor to a tab location.

Text-file reformatting may appear seductively simple to someone who has seen a file sent to a printer or across phone lines and has noticed that the same virtual image file could also be sent to another word processor. But as we've discussed, an image file only appears to have columns. It does not actually have embedded tabs. Receiving such a file, the 5520 operator could only modify that file as a typist would, without invoking any of the efficiency-adding capabilities of a word processor.

Successful text file reformatting between dissimilar application programs involves the stripping of control characters from the sending device and reinserting of functionally equivalent control characters for the destination device. Complications arise when the sending device and host device have different capabilities and there are no equivalent control characters to match up. Media conversion is a little like language translation. You can't perfectly word-for-word translation without losing some shades of meaning. The goal is to get translated information to look right and work right, too.

Industry is solving the file-sharing problem. In the year since February of 1984 when we proposed this project, systems have been introduced commercially to both convert text files between dissimilar applications programs and to convert disks from dissimilar operating systems. These products are emerging because the average Fortune 1350 company has equipment from three manufacturers and needs to share files without rekeying them. (Example: one device at Livermore Labs was used for text reformatting of 400 documents in one day.) Often, a large project will be completed by multiple operators on dissimilar systems.

Companies like Altertext (Appendix I) which offer these programs add a machine to their "can do" list only by writing separate text file reformatting programs between each newly-added system and each of the machines already in their "stable." So each new system added involved numerous, complex programs and a big investment. As a result, they are only provided for the the most popular systems.

Unless they become a major factor in the marketplace, devices in limited circulation, those with unusual operating systems, or those creating unusual machine-specific text files (like the Versatext or any devices customized for specific populations or applications) are doomed to be stand-alone units lacking file-sharing capability. For example, although Hewlett Packard computers are enormously popular in technical settings, they don't appear to be significant in word processing. We've discovered no one with plans to offer text file-sharing systems to/from Hewlett Packard, let alone to/from TSI's much less popular Versatext.

To be successful, these reformatting programs must be extremely sophisticated. There are three main categories of systems now on the market:

1. Conversion systems residing in custom hardware and software.

   Appendices I, J, K, L, and M show dominant examples of the most sophisticated equipment. Supported by necessary software, prices range from $2000 to $20,000.

   Text-file reformatting programs are only available for systems in most-popular demand. Appendix I shows the most widely assorted product line, and clearly indicates the dominant word-processing systems are those we've chosen for our study.

   Note that the only non-dedicated word processing system is the IBM PC . The decision to design word-processing for the blind around the IBM PC (and PC look-alikes like Compaq, the AT&T PC, the Tandy 1000, etc.) becomes increasingly apparent.

   Note also that only DisplayWrite 2, WordStar, and MultiMate applications programs are supported in this file transferring capability. Based upon frequency of mention, we conclude that these are the programs that must be accessible if the blind word-processing operator is to have a chance of file sharing today.

   At the outset of this study, we anticipated the possibility of needing to develop software text-file reformatting programs. But clearly, the marketplace is taking care of that. Major employers wanting to buy new word-processing systems to mix with their old ones need the very text-file reformatting programs that the blind job applicant with a Brand X machine requires.

2. Software systems residing in mainframe or workstations.

   These programs reside within dedicated word processors or mainframe systems. (See Appendices N, O, and P.) A complex program like Soft-Switch sells for $49,000. DCODE gains revenue at $20 per disk rather than charge for equipment.

3. PC-resident text reformatters.

   Most of the above manufacturers recognize the need to do text-file conversions between dissimilar applications programs within the IBM PC to introduce programs. Products are just starting to hit the market. Right now, the only announced product in our Appendices is Convertacalc in Appendix P.

4. Other.

   Photo composition services are increasingly involved in accepting disks written on dissimilar word-processing systems and converting them into typeset. Many of them are now acting as service bureaus. Expenses tend to be between $25 and $100 per disk. Cost per disk for this text-file reformatting is currently prohibitively high to be practical for the blind employee.

We've now discussed three of the five options proposed Objective 3 options---direct connection ("across phone lines or null modems"), disk sharing ("between different operating systems"), and uploading ("between different applications programs"). The last two options---protocol conversion and Local Area Networking---seem to provide a less-than-ideal categorization in light of today's emerging technological options. The most sophisticated "uploading" programs for file sharing between different applications programs now do many of the same tasks typically associated with protocol converters. So do emulator programs. So the distinctions between options are not clear-cut. The key questions seem to be whether operating systems and text formatting systems can be made compatible, regardless of the type of connection, local area networks, or disk shapes and sizes.

From the outset, emulator programs have been an important way to mainstream PCs into foreign terminal or word processing environments. Emulators perform the same role for the blind person who can access that PC with an adaptive device.

IBM and Wang emulators are the most important, since those two companies dominate the word-processing marketplace. As shown in the IBM product family diagram in Appendix D, IBM is committed to merge the PC into word processing environments formerly occupied by other offerings like the Displaywriter, 5520, etc. This merging is done in part via emulators.

DisplayWrite 2 is a software program that generates files on a stand-alone PC, files which are equivalent to those from the dedicated Displaywriter word processors and can be shared.

The 5520 emulator takes a different approach, allowing the PC to act as a 5523 terminal working on-line with the 5520 applications program editor. The resulting files are actually in the host 5520. It is not clear that files created with stand-alone applications programs can be file-shared for subsequent editing by other terminals in the 5520 network.

There are almost 3 million 3278 full-screen terminals in use. They are important but not dominant in word processing. They provide access to office system editors like those listed in Appendix Q. Emulators for 3278 are actually more important in information handling/retrieval jobs than in word processing (although an amazingly high percentage of people in the Visually Impaired Secretaries and Transcribers of America are using 3278 talking terminals.)

Our research did not discover any emulators for Wang Office Systems other than Wang's own PC. Making that PC useable by blind people would be a useful conduit to accessing a wide variety of Wang systems. Wang PCs can emulate IBM PCs and run word processing programs designed for the IBM device, but the resulting files apparently cannot be manipulated on Wang equipment operating in its native mode.

Xerox has announced emulation software which allows the IBM PC to work on Ethernet, Xerox's local area network. The IBM PC can also emulate NBI word processors using combinations of software and circuit boards.

The IBM PC is a clearly recurrent theme in our findings, not because of our predisposition to include it but because it is mentioned almost exclusively when there are discussions of PCs in the work setting.

**Local Area Networks** will not solve the file sharing needs of the blind word processing operators in the near future. Although networks are a logical trend as PCs take over and decentralize word processing, no one manufacturer or protocol is sufficiently dominant for an adaptive device manufacturer like TSI to design that protocol into our products. Secondly, the LAN still does not solve file sharing between dissimilar application programs. Costly conversion systems like those on page 14 can be time shared effectively when a LAN is present, so perhaps that is the real impact of LAN's, that they'll help make conversions more affordable.

Training Findings:

Employer-provided training

A recent survey by the International Word Processing Association indicates that employers believe that initial training on word-processing equipment should be provided by vendors with advanced training handled by company staff. Vendor performance varies widely, with Compucorp and Dictaphone both providing sufficient training (100%) to relatively low ratings shown for Lanier, Xerox, Wang, and IBM----i.e., all the major companies whose machines we've selected as most important.

Recent policy changes from the industry's major suppliers indicate that vendor-provided training support is being reduced or eliminated. Also, the trend toward PCs and associated off-the-shelf software means more training is left to software buyers or the stores supplying them. Interactive, self-taught courses like the 20-hour, two-volume "Using DisplayWrite 2" course from SRA are becoming popular (Appendix R). But these are not currently in a format accessible by blind people.

Eighty-three percent of the Fortune 1350 provide on-going training. Two-thirds of that training is in-house and twenty percent is with vendors at classes off-site. Most of the training is to improve skills of employees already doing word processing.

The need for this continuous upgrading of skills is clearly demonstrated by the fact that the well-known, national temporary employment company, Kelly Services (formerly Kelly Girl) trains and tests their employees using a special training device before sending them out to work. The device from Kee Systems (Appendix S) simulates the most popular word-processors and first trains, then tests whether the operator is using the system's features effectively or is using the system as an expensive typewriter.

Kelly Services will not let a temporary person competent in the DisplayWriter work at a site requiring WordStar without receiving separate WordStar training and testing <u>because that operator isn't necessarily efficient</u>. An eighty-five percent skill level is required on each task before the next task is introduced. Numerous major employers use the Kee System for training and testing. The clear implication for the blind employee is that there is a need to be fully competent with the devices to be taken to or encountered on the job.

## Training by rehabilitation agencies

Before submitting the proposal for this study, we phoned approximately one dozen college and agency centers training blind word-processing operators. During the study, we visited with staff from six of the country's most progressive centers.

Only a handful of agencies in the country are training blind people to use the types of dedicated word processors or PCs for which file sharing is available, and none are educated regarding file-sharing potential.

Agencies considering modernizing or starting word-processing training programs are not confident of sufficient students to undertake the investment. They cannot acquire staff members who understand PCs or software without a major fixed investment.

Rehabilitation training centers are involved somewhat in wishful thinking that training a blind person to use one system prepares him/her for effective use of a second. As Kee Systems sales of training and testing devices prove, people are not ready for effective use of a second system just because they're expert at one already. 83% of the Fortune companies provide ongoing training, and the average operator gets 10 to 50 hours of training per year to upgrade existing skills.

Students and teachers are frustrated by the number of "layers" of knowledge required to do word processing when both PCs and adaptive devices are involved. Training that simultaneously teaches PCs, adaptive devices, and applications programs leaves many Catch 22 situations like "not being able to use the PC until you have the adaptive aid but not being able to use the adaptive aid until you can use the PC."

Sometimes the operator finds that commands are situation dependent, not absolute as they should be. Perhaps a control character required to make the adaptive device announce a word is also used by the applications program to move forward a word. Conflicts between the adaptive aid and the application program are too apparent to the user and are confusing. This is especially troublesome, given reports that the average skill level of blind applicants is decreasing. Even if more expensive, user-friendly systems are warranted if they eliminate confusion between the media and the message.

With trainees' incoming skills decreasing, access to spell checking programs becomes increasingly important. Sighted operators can take these programs for granted, and blind operators with traditionally below average spelling skills (often due to reading contracted Grade II braille) need this compensatory tool even more. Medical and legal services still need transcriptionists, and DisplayWrite Legal Support (for DisplayWrite 2) and Easyspeller II (for Easywriter 2) provide such spell checking. These were the only two legal and medical spell checkers we discovered. They are PC-based, and DisplayWrite 2 once again becomes important.

Keyboards for the IBM PC and close look-alikes are renowned for the awkward location of their shift keys. Keyswapping programs (like SuperKey, ProKey, Keyswapper in Appendix T) as well as emulator programs with built-in key relocators (Impersonator, 3101, Softerm PC in Appendix U) must be compatible with adaptive devices for accessing PCs.

As mentioned earlier, keyboard operators are now expected to handle a wider range of activities now traditionally associated with word-processing. This includes using forms-filling programs, spreadsheet programs, and accessing data bases like Lexis for research. A well-designed adaptive device will prepare for these non-traditional training needs.

**Training-Imposed Design Requirements**

Our research suggests some training-related criteria for the well-designed adaptive device for blind word processing operators. The optimal aid must ---

- -allow adaptive aid training to be simple, minimal, and either provided by people who are not computer experts or through self-instruction
- -allow adaptive aid training to be segmented from applications program training
- -allow applications program training to occur in less-specialized settings (i.e., not just at rehabilitation centers, but at computer stores and schools via mainstreaming)
- -allow proficiency gained on one device prior to employment to carry over to the job (because that device can fit in via file sharing with other devices in the job setting)

-allow the blind person to do multiple tasks, not just word processing (thereby becoming less threatened by job obsolescence, more prepared for lateral or upward job mobility in various information-handling and retrieval applications)

-allow access to spell checking programs---especially medical and legal ones---and to keyswapping programs

**Summary of Phase I Findings:**

Employment:

The trend toward decentralized word processing threatens traditional transcribing-only jobs.

There is a clear trend toward PCs for word-processing.

Multi-tasking is increasingly important.

Technical:

To have the best prospect for file sharing in foreign machine environments while also using an adaptive device, the blind person should be using a PC and PC or MS DOS.

For file sharing from a PC, only DisplayWrite 2, WordStar, and MultiMate are currently accessible, only the most popular programs will ever be shareable.

Systems for disk operating system conversions and text file conversions have emerged commercially, costing $250 to $25,000. Cheaper, PC-resident versions are planned.

PCs can emulate some dedicated word processors and eliminate the need for file-sharing systems completely.

Training:

Multi-tasking and the trend to merge data processing and word processing mean the blind word-processing operator must be trained with additional skills.

To be competitive, an operator must be fully-trained on the specific machine he/she will use.

For PC-based word processing, manipulation of adaptive devices must be simplified to eliminate confusion over software "layers."

Customized point-of-sale software (with autoexecuting loading, etc) may be a key to simplifying layers.

# APPENDICES

APPENDIX HP

## HISTORICAL PERSPECTIVE

Obstacles confronting blind people in word processing have changed continually in the last dozen years. In the early 70's before the advent of the Optacon and the closed circuit TV, blind typists were generally employed as medical transcriptionists in hospital typing pools. They prepared documents that would not require revision or outside review. Modifications were dictated and appended to patient files.

With the advent of the Optacon and closed circuit TV's and still during the era of electronic typewriters (i.e., before word processing machines), blind typists were able to both identify and correct errors. They could now type perfect, first-time originals meant for outside inspection and subsequent revision. However, because the totally blind person could neither read handwritten input documents nor handwritten corrections of first drafts, they were -- and still are -- almost exclusively specialists typing first-time originals. They are in large word processing pools which have sufficient volume to allow such specialization.

With the introduction of word-processing machines with volatile video display screens, some challenges increased for blind typists. They were confronted with full-screen formats instead of the more-easily read and modified line-at-a-time formats. Devices like the Optacon or the CCTV with limited fields of view were often incapable of fully utilizing the power of the new word processors.

Training centers which were once comfortable preparing blind typists to use typewriters are now ill-prepared. Few can offer training with equipment -- and in the case of Personal Computers, the word processing software programs -- students will actually encounter in the job setting. Even when the required equipment is available, the range of its capabilities are seldom fully accessible. For example, printer ports might send text to speech, braille, or video adaptive device displays, but when menus and cursor locations remain unknown, the adaptive technology is simply insufficient.

Even the speech output systems introduced since this proposal was submitted in February, 1984, are limited. This includes TSI's own best-in-its-class PC VERT which reads full-screen

formats on IBM PC's. Only one of these systems can move cursors with job-required efficiency; most can't run all the most-required programs without competing with those application programs for key locations, and the ones that can add confusion to the task because the user needs to know a lot to get around the problems. This excludes some users with otherwise adequate skills and makes training very challenging. Probably fewer than a half dozen centers in the country understand the software technologies well enough to sequence its processing training meaningfully when an adaptive device is included.

Some of the obstacles encountered by the blind word-processing operator include:

- reading input documents and handwritten corrections.
- first-draft corrections and spell checks.
- completing draft revisions or arranging for others to do so.
- adequacy, length, cost and location of training.
- contributing to a group-generated document.
- often-inferior spelling skills.
- cost of adaptive equipment.
- ability to handle columnar material (like help menus) and system prompts.

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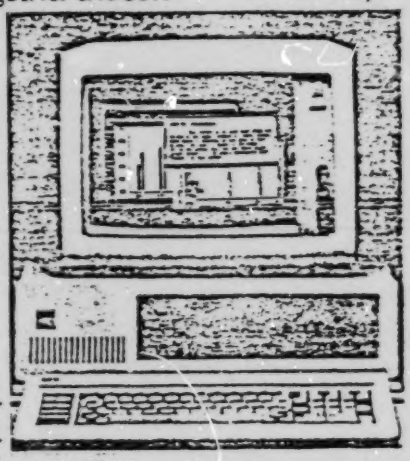

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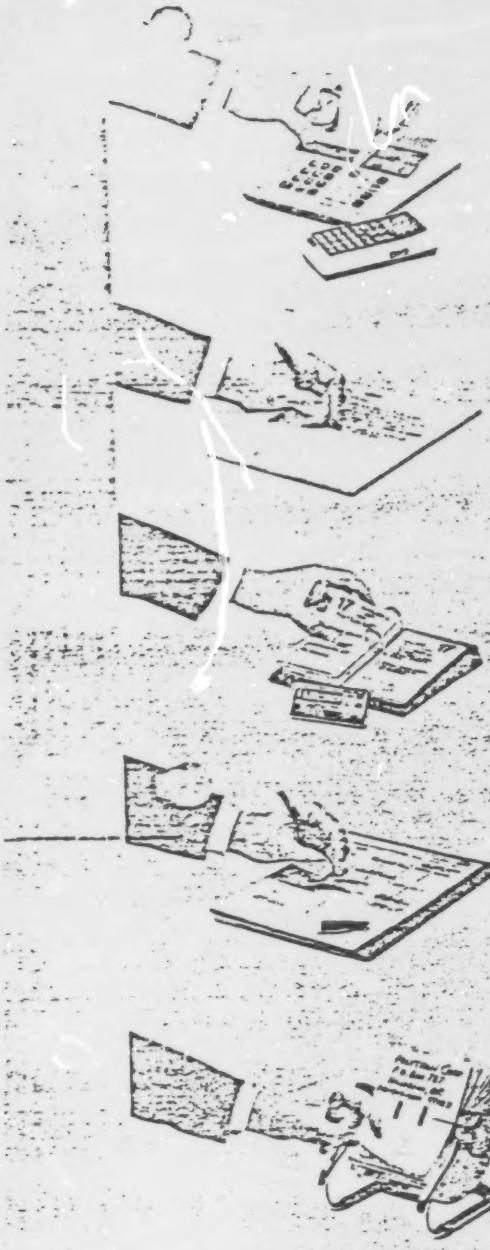
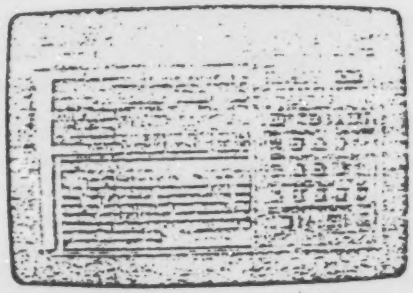
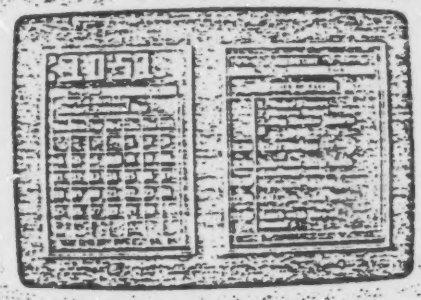
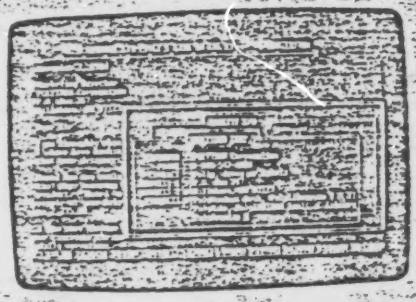




*Calculator, Memo Window Over 1-2-3*



*Alarm Clock, Calendar, Appt. Book*



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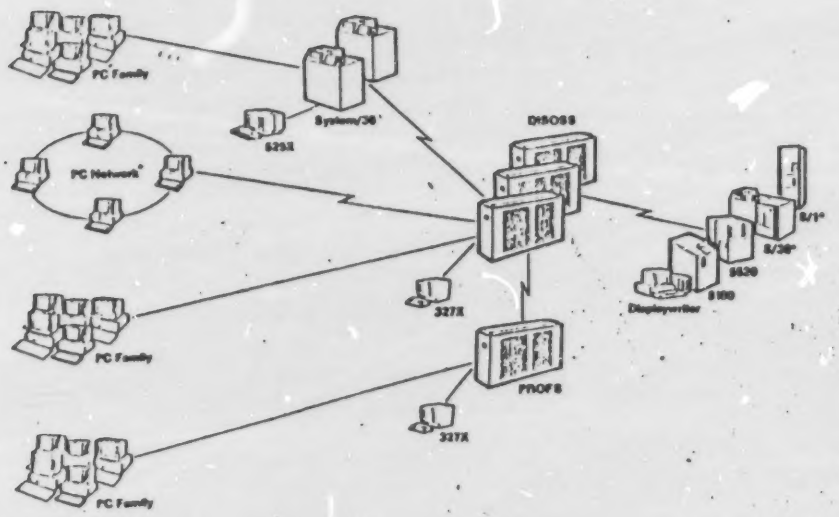
*PolyWindows was written by Thomas A. Griffin*

## IBM Office Systems




# Office systems: IBM lays it out

IBM hid it out. Office Systems, according to the company, is PCs and hosts, with maybe a departmental system or two if required.

In a major set of announcements made in October 1984, Big Blue introduced new lines of software linking its PC line to host-based office automation systems, principally the Distributed Office System (DISOSS) and Professional Office System (PROFS). Also in the picture: IBM's S/36 small business system, now described as 'departmental terminal and now PC users to call up facsimile images on their screens where these have been entered and stored under DISOSS). Latest moves include file transfer links to the other major IBM host system, the Professional Office System (PROFS) and increased levels of support for systems such as the S/36 and 5520.

The keystone of the new scenario, however, is a product innocuously named "Personal Services" ($250 for all IBM PCs except PCjr).

Personal Services links PCs mitted to any point in a DISOSS network.

- PROFS is still IN, but slipping. IBM's introductions expanded DISOSS access to 3270 terminal and PC users, and the company stressed the importance of DISOSS at the expense of PROFS. The latter remains IBM's main office systems offering for VM environments (DISOSS is not supported under VM), but it is otherwise being sidelined.
- The S/36 is IN. The S/38 is partially IN. The 8100 series, 4300 series, ) and Dissite and divisional processor applications rather than as part of the core office automation environment.

### A significant IBM move

Curiously, these announcements did not receive much coverage. Curious because there is good reason for treating them as one of the more significant IBM moves in years.

They represent the first time that IBM has effectively integrated the PC line as part of its main office automation scenario.

Until now, IBM product strategy for office systems had followed a different track from that for PCs (PCs being the territory of IBM's Entry Systems Division—which has created major problems for IBM by following a largely independent product strategy, most recently reflected in its own LAN system, the PC Network). The result was that the company's office systems directions tended to be in something of a vacuum, divorced from the fast-growing Fortune 500 PC market. Early in 1984 IBM began to address this problem by creating a new divisional-level function coordinated office systems strategy. These latest announcements are largely a result of that; it is notable that this activity has received some high-level support in IBM—from current president and ceo John Akers. (Although Akers helped launch the IBM PC back in 1979-80, his recent promoto kit out their PCs with Lotus 1-2-3 and third-party software for micro-to-mainframe links. If IBM can sell enough of the Fortune 500 market on its new scenario, it will have gone a long way towards extending its control of host mainframes and corporate DP departments down to desktop level.

It is clear that selling the scenario is much on IBM's mind. Somewhat lost in the plethora of software products was an interesting shift in IBM's distribution strategy. Where products linking PCs to hosts were previously available only through IBM's direct sales forces, they will now be going to retail dealers. The goal seems to be similar to the aims with the PC Network (which is also going through third-party retailers): IBM wants to pull its major retail dealers closer to the IBM fold. With retail chains such as Computerland and Businessland already accounting for most Fortune 500 sales of the IBM PC line, it makes sense for IBM to use these to sell scenarios as well as micros. Long term result would be that some of the largest micro distributors would help IBM establish its office systems scenario and provide valuable support for Big Blue's efforts to exert control over this sector. Having allowed the third-party vendors to take the lion's share of the market, IBM's goal now is to align them more closely with broader IBM product and marketing strategies —in effect, 'upgrading"



APPENDIX D-1

Big Blue introduced new lines of software highlighting its PC line to host-based office automation systems, principally the Distributed Office System (DISOSS) and Professional Office System (PROFS). Also in the picture: IBM's S/36 small business system, now described as a "departmental system" for Fortune 500 end-users and for attaching PCs at departmental level, a new version of its DisplayWrite word-processing software, the new PC Network local area network (LAN) system, and software linking IBM's various host systems for office automation.

The products introduced mark a further phase in IBM's efforts to tie its various systems into some kind of coherent office automation scenario (October has been IBM's month for doing this since 1981), but the real significance lay not so much in the products themselves but in the scenario presented by IBM. Briefly stated:

- PCs are IN as the main workstation for Fortune 500 end-users. 3270 terminals are OUT, to be consigned to production DP and other routine data entry tasks.
- The Distributed Office System (DISOSS) is IN. A host-based text-processing, storage and distribution system marketed by IBM since the 1970s, DISOSS now moves to center stage as the central host component of the IBM office automation scenario. Big Blue has enhanced it on a number of occasions, most recently with support for the Scanmaster I facsimile system (which has the interesting side-effect of allowing 3270 the Professional Office System (PROFS) and increased levels of support for systems such as the S/36 and 5520.

The keystone of the new scenario, however, is a prodfict innocuously-natified "Personal Services" ($250 for all IBM PCs except PCjr).

Personal Services links PCs to the host DISOSS environment for transfer of revisable- and final-form text transfers and messaging, doubling both as a text management and electronic mail system. At the same time, Big Blue indicated that it would extend Personal Services support to the S/36 and S/38 and provide further enhancements to enable PC users to access host document databases and library services under DISOSS.

The result: for the first time there is a single, coherent document-processing and messaging system linking the PC line to other IBM office systems.

Also part of the package is DisplayWrite 3 ($349), a new version of the WP software for the PC line first introduced by IBM last April. The new version is compatible with Personal Services, allowing text to be generated under DisplayWrite on a PC and variously worked on through or trans- expense of PR 3. The latter remains IBM's main office systems offering for VM environments (DISOSS is not supported under VM), but it is otherwise being sidelined.

- The S/36 is IN. The S/38 is partially IN. The 8100 series 4300 series, 5520 and Displaywriter are OUT. This somewhat clears up the IBM picture in the mid-range. Big Blue has kept the market guessing for some time over which way it would go in this sector; it also had been sending some confusing signals to end-users as to whether they should standardize on the 8100 series, 4300 series or S/36 for departmental systems applications. This time, the signals were clear: the S/36 will be supported by IBM as the key intermediate stage between hosts and PCs, with its own versions of DisplayWrite and Personal Services and a software product named PC Support/36 which provides expanded file transfer and concurrent operation support for PCs when attached to the system. The S/38 is partially IN in the sense that IBM plans to provide much the same functionality as for the S/36, but is pitching the more powerful system for high-end remote

legy. These latest announcements are largely a result of that; it is notable that this activity has received some high-level support in IBM—from current president and ceo John Akers. (Although Akers helped launch the IBM PC back in 1979-80, his recent promotion to president and ceo has seen him begin to "clip the wings" of the high-flying Entry Systems Division and pull it back into the corporate mainstream).

The moves also have some major implications for the Fortune 500 PC marketplace.

Up to now Big Blue has enjoyed a high market share (60-70%) of the Fortune 500 micro market, but relatively little control over it. The majority of PC line sales have been made via retail dealers. Corporate micro procurement functions have tended to be more independent-minded than their counterparts in IBM's traditional "turf," the corporate DP departments. One side-effect was that the company's host-based scenarios were not linking with the growing pattern of PC usage by Fortune 500 managers and professionals. For example: Fortune 500 micro buyers showed a distressing tendency

support for Big Blue's efforts to exert control over the sector. Having allowed the third-party vendors to take the lion's share of the market, IBM's goal now is to align them more closely with broader IBM product and marketing strategies —in effect, "upgrading" them.

Something for Big Blue's competition to consider. What are the prospects for, say, Apple Computer, to sell alternative scenarios when the likes of Computerland are busy selling PC Networks and DISOSS?

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PC WEEK NEWS OF THE WEEK

# IBM on Track to System Integration

*By Matt Kramer and Sam Whitmore*

The new IBM PC AT/370, the enhanced PC XT/370 and 3270 PC models and the Office Systems Family of software may not seem to have much in common.

However, the products, announced last month, forge closer ties between PCs and IBM's office-automation systems.

"Some users may be skeptical that [IBM] can put this together, but they want full-scale integration of their resources. They actually have no choice [but to rely on IBM]," said market analyst George Colony, of Forrester Research in Cambridge, MA.

The products included the enhanced 3270 PC and AT/370 and software that ties the PC closer to the *PROFS* and *DISOSS* mainframe office environments.

These announcements represent further progress toward IBM's oft-stated goal of integrating the entire spectrum of mainframes, minicomputers and PCs. By IBM's definition, integration means users will be able to run their programs and store data on all of IBM's computers.

## The Enhanced Lineup

The AT/370 is simply a standard PC AT with three specialized add-on boards (*PC Week*, Oct. 30) that allow it to run many mainframe-based VM/CMS applications.

The enhanced XT/370 provides users with 3278/79 emulation, a technology far more common than the 3277 emulation provided with the original XT/370. Nevertheless, users and analysts said, the overwhelming superiority of the 80286-based AT/370 makes the XT/370 expendable.

"I find it difficult to justify owning either XT machine now that the AT is here," said Tom Scales, manager of interactive services at Pallm Corp., located in Indianapolis.

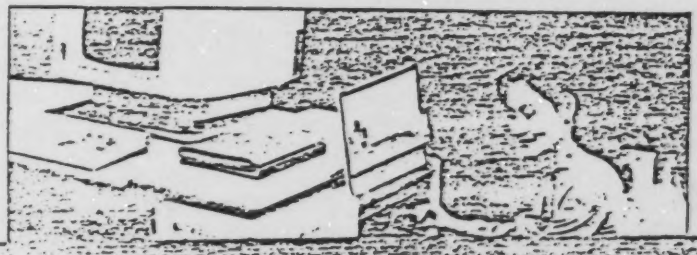
Scales said he can't wait to use the new 3270 PC 17-inch gas plasma display, also announced last month: "I've used the 3290 [gas plasma] display that IBM announced for OEMs a while back, and between the increased size and the clarity, it makes multitasking so much easier."

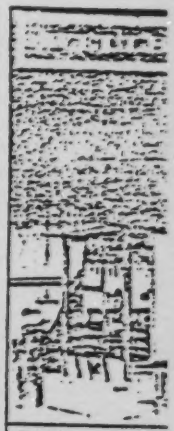
## 'Predictable' Products

Yankee Group analyst Frank Gens described the new PC-based products as "predictable," adding that IBM could have done better. "The VM running under the AT's VM/PC control program still is not the [24-bit] VM/SP running on mainframes," he explained. "What IBM really needs is some sort of micro-based 4300, and a product like that probably is two years away."

"The AT/370 was a very minor part of last week's announcements," said Jim Renalds, an analyst with Dataquest in San Jose, CA. "In my mind, the real significance was the blessing of the PC AT, the System/36, the 4300s and 308Xs as the four keys to IBM's long-term integration strategy."

Besides new editions of *DisplayWrite* software for the PC, the





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# BREAKING THE DISK COMPATIBILITY BARRIER

## Software lets computers read foreign disk formats

In the chaotic world of microcomputers, most models write onto floppy disks in their own unique way—so unique that one computer can rarely read a disk written by another. The physical disk drives may be identical, but the format in which each computer stores information is not. To overcome this problem, disk conversion programs temporarily change the computer's operating system, configuring one of its drives to different parameters and thereby allowing information to be passed between otherwise incompatible disks. When a computer formats (initializes) a disk to prepare it for use, it divides the space available for data storage into concentric tracks, and partitions each track into equal-sized arcs called sectors. Each sector is assigned an address the computer can use to locate data stored there. Additionally, a specific space must be set aside in which to store the operating system, and a directory must be created to keep track of stored files. Unfortunately, few computer companies can agree on how this should be done.

The standard solution to this problem has been to telecommunicate the information stored on dissimilar disks, but conversion programs are a better and quicker way for one machine to read the disks of another.

The UniForm program from Micro Solutions, originally designed for the Kaypro II computer, now runs on other popular eight-bit CP/M-80 computers. UniForm sets the host computer's second disk drive to the format of a foreign computer, so you can not only transfer programs and data but in some cases run a program directly from the foreign disk.

The menu-driven UniForm program lists three categories of disk transfers: those among a variety of CP/M-80 formats, bidirectional transfers between MS-DOS/PC-DOS and CP/M-80, and one-way transfers of TRSDOS/LDOS files (Radio Shack Models 3 and 4) to CP/M-80 disks.

The category with the most power and variety is the CP/M-80 transfers. UniForm (on the Kaypro 4) can format a disk in 21 single-sided and 17 double-sided CP/M-80 configurations. In addition, you can set the B drive to any of these configurations, remove the UniForm disk from the A drive, and then use the Kaypro in the normal way. All CP/M-80 commands and procedures apply for file transfer and, where hardware permits, running a program on the foreign disk. Once set, this foreign format stays in effect until changed. Each time the computer is warm-booted, a notice reminds you that the B drive is set to this foreign format.

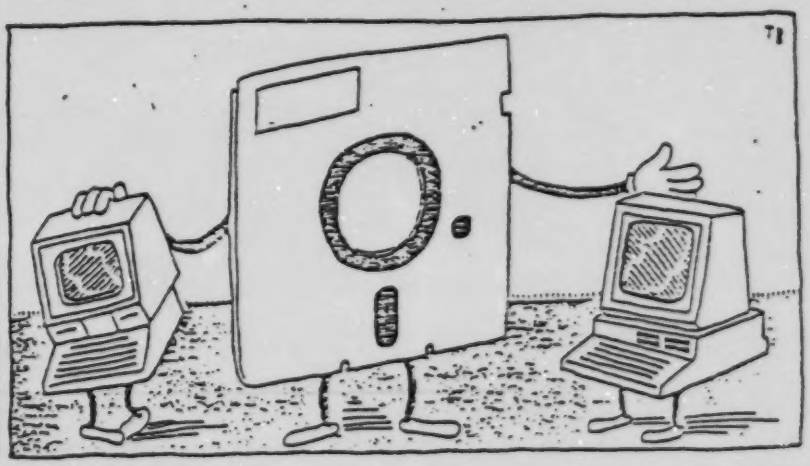
MS-DOS/IBM PC-DOS conversions are useful only for transferring data files to and from the standard 5¼-inch MS-DOS format. Since this format has been adopted by the IBM PC and some 50 other models, access to it opens the door to many other computers.

If you use an IBM PC or a close compatible, Vertex Systems offers three versions of Xeno-Copy to read and/or write in foreign disk formats. The basic Xeno-Copy program lets an IBM PC read disks in 47 formats. The menu-driven program, in its simplest form, is reasonably easy to use. If you buy the Advanced option, things can get more complicated. Here an additional selection permits you to "roll your own" format by entering parameters for a disk not on the menu, although you must be comfortable exploring CP/M-80's CBIOS to decipher the disk parameters. Or you can send a disk in the unfamiliar format to Vertex; if they can successfully add this format to the program, they will provide a free upgrade for the copy you purchased.

To move files the other way, from MS-DOS to another format, spend an extra $50 for Xeno-Copy with the Plus option. It can write most of the formats Xeno-Copy can read. Companies that distribute a small to a medium amount of software may find the Xeno-Disk program the best solution; in addition to the Xeno-Copy and -Write functions, it lets an IBM PC initialize disks in many foreign formats and rapidly duplicate foreign disks track by track.

Having gone to the trouble of moving a file between two computers, what can you do with it? In most cases, there is no point in moving an executable program between two different operating systems; without additional conversion it won't run on the second computer. For example, a CP/M-80 program won't run on a CP/M-86 or MS-DOS computer, and a TRSDOS program won't run on a CP/M-80 unit—although both CP/M and TRSDOS computers use a Z80 processor.

Text and many data files, however,



by Steve Lambert

can be used normally on the second computer with little or no problem. Text files generated by a word processor usually have embedded formatting instructions that control such things as underscoring and margins. These formatting codes may be either visible or hidden, and they will be understood only by a matching word processor on the second computer. For instance, a CP/M-80 WordStar file can be used by an MS-DOS version of WordStar with no changes; all the formatting information is understood. But if the transferred file will be used by another word processing program, the formatting information will probably be meaningless, and some work may be necessary to remove it so the second program won't be confused. The most efficient way to remove formatting codes is with the program that put them there—before the text is transferred. If this isn't possible, then global search and replace techniques can generally be used on the destination computer, though not as efficiently.

For data files, moving between corresponding programs works well—between dBase II programs on different computers, for example. Also, several programs now allow you to save and load files using Microsoft's Symbolic Link (SYLK) format. Files saved in this format can be transferred between computers and then used by other programs that recognize the format. SYLK is the only common interchange format that can save both relationships and formulas. Software Arts' Data Interchange Format (DIF), used by VisiCalc and several other programs, also works but saves only current values.

Programs written in BASIC and other higher-level languages are best transferred in ASCII source code (as opposed to the binary or compiled forms). This will require the appropriate interpreter or compiler on the destination machine to run the programs, but it will also allow you to modify the source code, if necessary, to match the specific hardware.

Although format conversion programs are gaining power, some conversions are impractical for a low-cost program and a standard microcomputer. The Apple II disk format is too different, as are the hard-sectored formats used by many dedicated word processors and typesetting machines. Some specialized computer equipment uses complex directory schemes and text recording methods that border on encryption. Often the easiest method of transferring data between these difficult formats is with a modem and proper communication software. If this isn't possible, and you have sufficient need, you can try one of the service bureaus that specialize in disk conversion.

Some of these companies will also translate the word processing codes in your text files to match those used by a different program or by a typesetting machine. This is a complex process, since over a thousand codes are in use; essentially no two systems use the same codes. The conversion is rarely complete, because system capabilities vary greatly.

If you are willing to spend the money, several companies supply expensive ($11,000 and up) equipment that can read and write almost any format and do custom code conversion. These machines can handle conversions between tape and both 5¼- and 8-inch disks—and the new microfloppy disks will undoubtedly be added soon. ❑

## ADDRESSES

**Disk conversion software:**

**Micro Solutions (UniForm)**, 125 S. 4th St., DeKalb, IL 60115, (815) 756-3421. $49.95.

**Vertex Systems (Xeno-Copy)**, 7950 W. 4th St., Los Angeles, CA 90048, (213) 938-0857. $99.50-$379.50.

**Translation machines:**

**Altertext**, 210 Lincoln St., Boston, MA 02111, (617) 426-0009. $12,000-20,000 plus $1000 per format.

**Antares Corp.**, PO Box 159, Lake Elmo, MN 55042, (612) 439-0075. Base price $55,000 plus software charges.

**Applied Data Communications**, 14272 Chambers Rd., Tustin, CA 92680, (714) 731-9000. Base price $19,900 plus software.

**Itek Corp.**, 34 Cellu Dr., Nashua, NH 03060, (603) 881-8448. $11,500-15,500 plus software.

**Shaffstall Corp.**, PO Box 50990, Indianapolis, IN 46256, (317) 842-2077. $14,250-22,500 plus software.

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*Steve Lambert is a freelance writer in Seattle and author of* Presentation Graphics on the Macintosh *(Microsoft Press, 1984).*


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What happens if civilization continues to slowly choke out wildlife species by species?

Man cannot live on a planet unfit for animals.

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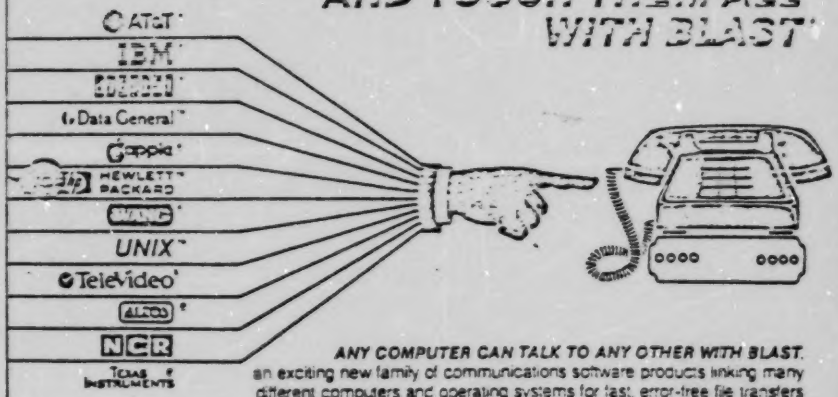
# REACH OUT AND TOUCH THEM ALL WITH BLAST




***ANY COMPUTER CAN TALK TO ANY OTHER WITH BLAST,*** an exciting new family of communications software products linking many different computers and operating systems for fast, error-free file transfers via dial-up phones. Micros, minis, and mainframes become compatible, despite diskette and data format differences.

***NO EXPENSIVE ADD-ON BOARDS NEEDED!*** BLAST software uses standard RS 232 ports and low-cost asynchronous modems (300, 1200, 2400, 4800 baud) or direct-connect at speeds up to 19,200 baud.

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***FULL DUPLEX, SLIDING-WINDOW PROTOCOL*** speeds data thru the noisiest phone lines, thru satellite-routed phone links, over packet-switched networks, or over local area networks.

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BLAST is available for 85 major computers including the following:

**Mainframes** $2495 IBM MVS, TSO or VM/ CMS **SPERRY** 1100
**Minis** $495-$2995 **DIGITAL EQUIPMENT** VAX/VMS, PDP, RSX **HEWLETT PACKARD** 3000/MPE and 1000/ RTE **DATA GENERAL** AOS/VS, RDOS, DOS/M/V **WANG** VS **AT&T** 3B2, 3B5, 3B20 **NCR** TOWER/UNIX and soon **PRIME** PRIMOS
**Micros** $250 **APPLE** DOS, CP/M and soon Macintosh. Any **MS-DOS/PC-DOS, CP/M 80, CP/M 86** Generic BLAST available for MS-DOS, CP/M, and UNIX

BLAST™

COMMUNICATIONS RESEARCH GROUP
8939 JEFFERSON HWY, BATON ROUGE, LA 70809
(504) 923-0888

# WHAT CAN YOU DO WITH BLAST

Transfer files to and from Lotus, WordStar, dBase II, VisiCalc, etc. with other micros or with central systems (micros, minis, or mainframes).

Support remote sites with programs, patches, updates, revisions, using BLAST for full control. Perform program repairs by phone, even if no operator is available at the remote site.

Send charts, graphs, sales data, reports, etc., while simultaneously receiving electronic mail/messages. Or automatically retrieve statistics from unattended data collection computers.

Use central processing systems to store text and binary files from micros (such as word processing texts, engineering data, financial programs and data, etc.)

Share document preparation for large office projects and overflow workloads among different locations; let other office personnel aid in managing overflow jobs. BLASTing the raw data between offices.

Collect data from many sites at central systems without involving expensive leased lines or expensive hardware. Use BLAST and auto dial to poll remote sites at night while rates are low. Send in job cost, payroll, other financial data error-free from micros to hosts.

Create low-cost networks among many sites and among many different kinds of PCs, without buying and installing "boards" on each micro, and without using leased lines. Network multiple sites for automatic inventory inquiries, order entry, invoicing, or pricing updates. Include minis and mainframes too.

Work from home! Set up telecommuting programs for accessing data on central office systems from micros at home.

Create an instant, low-cost electronic mail and messaging system. BLAST offers an easy-to-use store and forward facility.

Use BLAST to auto-dial Western Union's Easy-Link or other mail services. BLAST has full automatic access.

Use Packet-Networks (Telenet, Tymnet, etc.) for economical regular access of host systems by micros. BLAST is available on database services (such as Compuserve) and can be accessed error-free by other BLASTs for low-cost nationwide file transfer.

Design your own special projects or applications with BLAST built-in as your data transport facility. Call BLAST as needed within your program.

Price List Effective August 1, 1984 — Dealers Inquiries Invited

| [illegible] Model | Op System | Price |
|---|---|---|
| **ACT** | | |
| APRICOT | MS-DOS | $ 250 |
| **TOS** | | |
| 000 | CP/M | 250 |
| 595 | XENIX | 395 |
| | CP/M-86 | 250 |
| 195 | CP/M-86 | 250 |
| **ANDERSON JACOBSON** | | |
| PASSPORT | MS-DOS | 250 |
| | PC-D200 | 100 |
| **APPLE** | | |
| II, E, + | DOS 3.3 | 250 |
| | CP/M | 250 |
| LISA | LISA | 395 |
| MACINTOSH | MAC | 350 |
| **ACI** | | |
| PC1600 | MS-DOS | 250 |
| **AT&T INFORMATION SYSTEMS** | | |
| 382 | UNIX | 495 |
| 385 | UNIX | 795 |
| 3B20 | UNIX | 1695 |
| 6300 PC | MS-DOS | 250 |
| **BASIS** | | |
| 108 | CP/M | 250 |
| **BLAST BOX** | | |
| ALL | | 695 |
| **BURROUGHS** | | |
| B20 | MS-DOS | 350 |
| **BYTEC** | | |
| HYPERION | MS-DOS | 250 |
| | PC-D200 | 100 |
| **CANNON** | | |
| AS-100 | MS-DOS | 250 |
| **CASIO** | | |
| FP-1000 | CP/M | 250 |
| **DLBY PC** | | |
| KIT | MS-DOS | 250 |
| **COLUMBIA** | | |
| MPC, VP | MS-DOS | 250 |
| | CP/M-86 | 250 |
| | PC-D200 | 100 |
| **COMPAQ** | | |
| COMPAQ, COMPAQ + | MS-DOS | 250 |
| | CP/M-86 | 250 |
| | PC-D200 | 100 |
| **CORONA** | | |
| CORONA PC | MS-DOS | 250 |
| PORTABLE | MS-DOS | 250 |
| **CROMEMCO** | | |
| 8 BIT | CP/M-80 | 250 |
| **DATA GENERAL** | | |
| MPT | MPOS | 495 |
| MICRONOVA | MPOS | 495 |
| | DOS | 495 |
| NOVA | MPOS | 495 |
| | UNMAP RDOS | 495 |
| | MRDOS(ICOS) | 595 |
| CS30 | UNMAP (ICOS) | 495 |
| CS40 | MRDOS (ICOS) | 595 |
| CS50-up | MRDOS(ICOS) | 595 |
| | AOS | 695 |
| ECLIPSE | MRDOS (ICOS) | 595 |
| | AOS | 695 |
| DESKTOP | MRDOS | 350 |
| | AOS | 350 |
| | MS-DOS | 350 |
| MV ALL | AOS VS | 995 |
| DGC 1 (Book) | MS-DOS | 250 |
| **DIGITAL EQUIPMENT CORP** | | |
| VAX | VMS | 895 |
| | UNIX (BERKLEY) | 895 |
| | UNIX (SYSTEMS) | 895 |
| PDP-11 | RSTS | 795 |
| | RSX | 695 |
| | 350 | 495 |
| | RT-11 | 395 |
| [illegible]-180 | CP/M | 350 |
| RAINBOW | MS-DOS | 250 |
| [illegible] 100+ | CP/M-86 | 250 |
| **DELTA PRODUCTS** | | |
| 8 BIT | CP/M | 250 |
| **DIGITAL MICRO SYSTEMS** | | |
| DSC-3 | CP/M | 250 |
| **DURANGO** | | |
| 8 BIT | CP/M | 250 |
| **DYNABYTE** | | |
| 5000 | CP/M | 250 |
| 6500 | CP/M | 250 |
| 6900 | CP/M | 250 |
| **DYNALOGIC** | | |
| HYPERION | MS-DOS | 250 |
| | PC-D200 | 100 |
| **EAGLE** | | |
| PC SERIES | MS-DOS | 250 |
| | CP/M-86 | 250 |
| | PC-D200 | 100 |
| **ELECTRO DESIGN** | | |
| IMP-12 | MS-DOS | 250 |
| **EPSON** | | |
| QX-10 | CP/M | 250 |
| **GENERIC BLAST** | | |
| | CP/M-80 | 250 |
| | MS-DOS | 250 |
| | UNIX | 495 |
| | FORTRAN* | N/C |
| **HARRIS** | | |
| ALL | VULCAN | 1495 |
| **HEWLETT PACKARD** | | |
| HP 120/125 | CP/M | 250 |
| HP 150 | MS-DOS | 250 |
| HP 1000* | RTE | 395 |
| HP 3000* | MPE | 895 |
| **HONEYWELL** | | |
| 6/10 | MS-DOS | 350 |
| **IBM** | | |
| MAINFRAME | MVS/TSO* | 5500 |
| | VM/CMS* | 5500 |
| PC, XT | MS-DOS | 250 |
| | CP/M-86 | 250 |
| | PC-D200 | 100 |
| **INTEL** | | |
| MDS-800 | CP/M | 250 |
| **INTERTEC** | | |
| SUPER BRAIN II, JR, QD, SD, COMPUSTAR | CP/M | 250 |
| **ITT INFORMATION SYSTEMS** | | |
| ITT XTRA | MS-DOS | 250 |
| **KAYPRO** | | |
| 2, 4, 10 | CP/M | 250 |
| **LOBO** | | |
| MAX 80 | CP/M | 250 |
| **LOGICAL** | | |
| LX-T | MS-DOS | 250 |
| **MOSTEK** | | |
| STD BUS | CP/M | 250 |
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| MD1, 2, 3 | CP/M | 250 |
| **MOLECULAR** | | |
| SM8, 32 | CP/M | 250 |
| **NCR** | | |
| DECISION MATE V | CP/M | 350 |
| | MS-DOS | 350 |
| TOWER | UNIX | 495 |
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| | CP/M-86 | 350 |
| | PC-D200 | 100 |
| **NORTHSTAR** | | |
| ADVANTAGE | CP/M | 250 |
| HORIZON | CP/M | 250 |
| **OSBORNE** | | |
| OSBORNE I | CP/M | 250 |
| EXEC I, II | CP/M | 250 |
| **OSM** | | |
| ZEUS 3/4 | CP/M | 250 |
| OSM-PC | MS-DOS | 250 |
| **OTRONA** | | |
| ATTACHE | CP/M | 250 |
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| SR PART | MS-DOS | 250 |
| **PIXEL** | | |
| 80 | UNIX | 495 |
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| ALL | PRIMOS | 1450 |
| **PRODIGY** | | |
| 8 BIT | CP/M | 250 |
| **RADIO SHACK** | | |
| TRS-80 M2, M4 | CP/M | 250 |
| Tandy 2000, 1200 | MS-DOS | 250 |
| **RESPONSE HOUSE** | | |
| 8 BIT | CP/M | 250 |
| **SEIKO** | | |
| 8500 | MS-DOS | 250 |
| **SIERRA** | | |
| 8 BIT | CP/M | 250 |
| **SPENCO** | | |
| 8 BIT | CP/M | 250 |
| **SPERRY** | | |
| 1100* | OS | 5500 |
| PC | MS-DOS | 250 |
| **STEARNS** | | |
| DESKTOP | MS-DOS | 250 |
| **TAVA** | | |
| TAVA PC | MS-DOS | 250 |
| **TELEVIDEO** | | |
| TPC-11 | MS-DOS | 250 |
| TS801 | CP/M | 250 |
| TS802 | CP/M | 250 |
| TS803 | CP/M | 250 |
| TS804 | CP/M | 250 |
| TS1603 | MS-DOS | 250 |
| | CP/M-86 | 250 |
| TS1605 H | MS-DOS | 250 |
| | CP/M-86 | 250 |
| | PC-D 200 | 100 |
| **TEXAS INSTRUMENTS** | | |
| PROFESSIONAL | MS-DOS | 250 |
| | CP/M-86 | 250 |
| PORTABLE | MS-DOS | 250 |
| **VECTOR GRAPHIC** | | |
| 8 BIT | CP/M | 250 |
| **VICTOR TECH.** | | |
| 9000 | MS-DOS | 250 |
| **WANG** | | |
| VS | OS | 2495 |
| PRO | MS-DOS | 250 |
| **XEROX** | | |
| 820 | CP/M | 250 |
| 820-II | CP/M | 250 |
| **ZENITH** | | |
| Z-89/90 | CP/M | 250 |
| Z-100 | CP/M | 250 |
| Z-100's, Z-150 | MS-DOS | 250 |
| | CP/M | 250 |
| | CP/M-86 | 250 |
| **ZILOG** | | |
| Z8000 | ZEUS | 495 |
| **3R** | | |
| AVATAR | CP/M | 250 |

*Requires use of the BLAST BOX on any asynchronous port at a cost of $695/port.

Name _____

Store/Company _____

Address _____

City _____ State _____ Zip _____

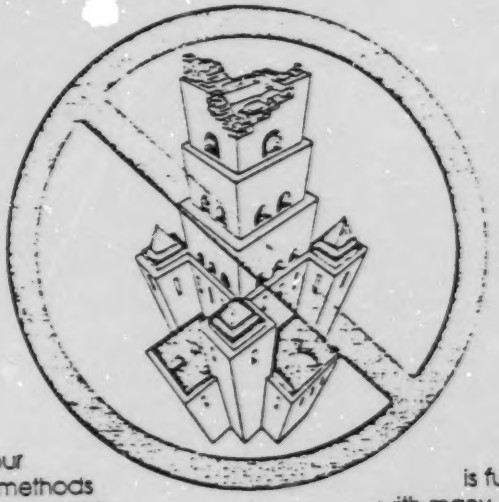
Phone _____

For more information on BLAST attach your business card or fill in the information blanks above. Mail to:
Communications Research Group
8939 Jefferson Highway
Baton Rouge, LA 70809
(504) 923-0888 TELEX 75-9985

# PRODUCT DATA

## READ & WRITE DOZENS OF DIFFERENT DISK FORMATS IN YOUR PC WITH XENO-COPY™

### Direct disk-to-disk file transfers. No modems. No serial links. No hardware.



In the Old Testament, man's excessive ambition results in the Tower of Babel where no one speaks the same language. In modern times, the microcomputer industry has achieved the same result without any direct divine intervention. Now, with XENO-COPY, you can read and write dozens of different disk formats in your IBM-PC or PC-compatible.

Before XENO-COPY, file transfers between different computers required expensive hardware like a serial interface for both computers, complicated RS-232 cables, two modems, access to noise-free telephone lines, etc. In addition, expensive telecommunications software was required for both computers. All this hardware and software adds up to an investment of $300 to $800 or even more. Finally, after installing and debugging the hardware and software, there is still the problem of lengthy transfer sessions due to slow serial baud rates. For example, at 300 baud a single 100 KB datafile can take up to 60 minutes to transfer. Faster rates cut the transfer time, but as a result, transfer errors can compound your problems.

Now the affordable XENO-COPY can transfer your files in seconds instead of minutes or hours. Let's say you have an IBM PC, XT or PC-compatible computer at the office, a KAYPRO in another field location, and a Heath/Zenith Z89 at home.

You changed your product pricing methods using Supercalc last night and need to distribute your new template. Leave the computers where they are and forget about the modem hassles. Just bring your Zenith diskette to the office and transfer the Supercalc file to a PC-DOS diskette using XENO-COPY in your PC. Then, transfer the file from your PC DOS diskette to a KAYPRO diskette and send the disk to your field location. That's all there is to it!!

The XENO-COPY software utility runs under PC-DOS (MS-DOS) in many different host computers. It reads, copies and writes files on dozens of different 5 1/4" floppy disk formats. XENO-COPY is fully menu-driven and extremely easy to use. The 'SPECIAL OPTIONS' menu lets you select the host computer, specify source and destination disk drives, display text file contents to the video screen, rename a file as it is copied, and more. The 'DISK FORMAT' menu allows you to choose your source or destination disk format. No technical knowledge of disk formats is required.

XENO-COPY is fully compatible with many different host computers, different drive configurations, hard disk systems, and most current DOS releases.

Please see the reverse side for additional information. If your needs aren't met by these capabilities, feel free to contact Vertex Systems.

**"It's one of the most valuable utilities that I've seen."**
—reprinted from Interface Age, 1/84, S. Ginsberg, author.

**"In each case the transfer worked perfectly...this product does, with minimum fuss, precisely what its marketers claim."**
—reprinted from PC Magazine © 1984, Ziff-Davis Pub. Co.

**UPDATE**

Xeno-Copy PLUS Version 2.1 (Now Available) Formats Blank Disks as well as reads and writes over 100 different disk formats at no price increase.

Vertex systems
6022 W. Pico Blvd., #4
Los Angeles, CA 90035
(213) 938-0857

Innovation in microcomputer products

## AVAILABLE VERSIONS

| | |
|---|---|
| Xeno-Copy™ | ONE-WAY FILE TRANSFER. Copies files from 50 different disk formats to your DOS disk. |
| Xeno-Copy PLUS™ | TWO-WAY FILE TRANSFER. Copies from your foreign disk to DOS and also copies DOS files to pre-formatted foreign disks. |
| ADVANCED Option | Additional capabilities for Xeno-Copy or Xeno-Copy PLUS. Read/write 80-track formats (80-track drive needed). Enter disk parameters to read/write unsupported 40 and 80 track CP/M formats. Ask about popular 8" disk format support. |
| XENO-DISK™ Production System | Read, write, format and duplicate foreign disk formats. Text filters aid datafile conversion. Supports 80-track and 8" CP/M disk formats with additional hardware. Call for formats and availability. For the software developer, small publisher, university, or organization with multiple computers. Turn your PC into a disk production machine at a fraction of the cost of comparable solutions. |

## SUPPORTED FOREIGN DISK FORMATS

Access Matrix
*ALTOS
Associate
Avatar TC10 48TPI
Byad CP/M-80
Columbia CP/M-80
Chameleon CP/M-80
Cromemco CDOS
DEC VT180
*DEC Rainbow 100 CP/M-86/80
Digilog 1000 Turbodos
*Eagle II
*Eagle CP/M-86, MPM-86
Epson QX-10 CP/M, Valdocs, Multi-font
Groupil III CP/M
HP 86A & 125 CP/M
IBM CP/M-86
IBM p-System
Kaypro II
LNW CP/M 40 tr.
Lobo CP/M
*Monroe
Morrow Designs CP/M
Micral 9050 CP/M-80
NCR Decision Mate 5
NEC PC8001a CP/M & NECDOS
Osborne double density
Osborne Osmosis double density
Otrona Attache
*Pied Piper
PMC Micromate 40 tr.
Quark
Reynolds & Reynolds TC1000
Sanyo MBC-1000, 1100, 1150
*Sanyo MBC-4050
Sharp YX3200
Wang MAWS CP/M
Superbrain Jr., QD
Televideo TS802/3/6 port. and Turbodos
TI Pro CP/M SS
Toshiba T100
TRSDOS, Color Computer
TRSDOS 1.3 (modified)
TRS-80 Mod III CP/M
TRS-80 Mod IV CP/M
Xerox 820-II CP/M SS
Zenith Z89/90 CP/M w/Z37 or Magnolia controller
Zenith Z100 CP/M SS
Zorba SS

*80-TRACK DISK FORMATS (ADVANCED OPTION & 80-TRACK DRIVE REQUIRED)

The above formats reflect our latest software release and are NOT a firm specification. Different versions offer different capabilities and new formats are being added—please contact Vertex for the latest information.

## XENO-COPY RUNS ON THE FOLLOWING COMPUTERS:

- Chameleon & Chameleon PLUS
- Columbia MPC
- Compaq & Compaq PLUS
- Corona PC
- Eagle PC/XL/Spirit
- Hyperion (Rev 5)
- IBM PC & XT
- IBS
- ICOM-301
- Micromint MPX-16
- Olivetti M-18
- Sperry PC
- Tava PC
- Televideo 1605
- Zenith Z-150
- Zenith Z-160

- DEC Rainbow 100-ask about IMPORT! running under CP/M-86/80

Host computers must be PC-compatible to the interrupt level and run MS-DOS. Call for latest host computers.

### USES & LIMITATIONS

This software is distributed on copy-protected disks to encourage software registration and allow maximum support to registered users. A backup disk can be obtained directly from Vertex at nominal cost.

XENO-COPY PLUS will NOT format a blank disk in a foreign disk format. That capability is available with the XENO-DISK Production System.

In general, foreign disk formats must be 5¼" soft-sectored, double-density 40 track configurations. 80-track and limited 8" CP/M (soon) disk formats are supported with either ADVANCED option or XENO-DISK and with appropriate disk drives.

Transferring TRSDOS 1.3 files to DOS currently requires a two-step process and direct access to a TRS-80 Model III/IV. Other enhancements are planned—contact Vertex Systems for more information.

XENO-COPY will properly transfer ANY kind of disk file—including text, data and program files. Host computers with dual-processors, co-processor cards or with the Vertex 80Mate CP/M Emulator software utility can usually run most CP/M-80 programs directly after transfer. However, XENO-COPY does NOT modify the files in any way. Therefore, it is sometimes up to the user to determine whether the transferred file is appropriate in its new computer environment.

### HARDWARE & SOFTWARE REQUIREMENTS:

- 128KB of main memory and two floppy disk drives. A fixed or hard disk subsystem may replace one of the floppy drives in most configurations. Two floppy drives required for the duplicate function in the XENO-DISK system.
- PC-DOS 1.1, 2.0 or 2.1 (equivalent MS-DOS releases in compatible computers).

### YOUR LOCAL DEALER

# Program adds flexibility

By FRANK RUIZ
Tribune Business Writer

## Software Review

A new version of Uniform is on the market.

Uniform is a program developed by Ron Proesel of DeKalb, Ill., that allows computers to read diskettes from other computer models.

The advantage is that someone who works with say, an IBM PC at work, can take home a diskette of work files (reports, letters, and so on) and work on them at home using some other brand of personal computer.

There are several versions of Uniform. You have to get the one designed for your particular machine. There is also a difference between the MS-DOS (IBM-type machines) version and the one for the CP/M operating system.

I've tried both. Using the MS-DOS (or PC-DOS) version with an IBM PC XT, I was able to use files that were created on a CP/M computer, on the IBM model. The program allowed a disk full of word processing files to be copied onto the hard disk of the PC XT, then transferred back onto another CP/M disk.

With a program like Uniform, you may also copy software programs to "foreign" disks. However, it should be clear that software programs designed to work on one machine won't work on the other machines, even though you can copy them from machine to machine. The usefulness of Uniform lies in being able to read data base, or word processing files on various machines.

There is another use. Small software companies can make their software available on a variety of disk formats because Uniform also allows you to format disks for about 60 to 70 different computers, depending on the version you get.

I also looked at a similar program called Compat. This one was developed by Mycroft Labs of Tallahassee. It, too, does most of the things Uniform does.

One thing to like about Compat is that if you use a computer with two disk drives, you can temporarily change them to act like drives for two entirely different machines. For instance, let's say you have a DEC 100. You can make the computer believe that the second drive is actually an IBM drive and write stuff to it, and also copy from it.

Both Compat and Uniform come with slim user's manuals that are fairly easy to understand and use. The best way to learn most software is to fool around with it for awhile until things fall into place and you say, "Oh, that's how it works."

(For information about Uniform, write: Uniform, Micro Solutions, Inc. Software Div., 125 S. Fourth St., Dekalb, Ill. 60115. For information about Compat write: Mycroft Labs, P.O. Box 6045, Tallahasee, Fla., 32314.)

# Software library

October 1, 1984

**Read Programs**
(as of 10/1/84)

AM CompEdit
CPT
Compugraphic Editwriter
DEC
DECmate II
IBM 5520
IBM Displaywriter
IBM 3740
IBM Office System 6
IBM PC MS/DOS Multimate
IBM PC MS/DOS Text
IBM PC MS/DOS Wordstar
Lanier No Problem
Micom
NBI
Olivetti
Philips
Siemens
Syntrex
Tel-Ekonomi
Vydec
Wang OIS 8"
Wang OIS 5 1/4"
Wang PC
Wordplex
Xerox 860

**Write Programs**
(as of 10/1/84)

Compugraphic MCS
CP/M Wordstar 8"
CPT
DECmate II
DEC
IBM Displaywriter
IBM PC
NBI
Wang OIS 8"
Wang OIS 5 1/4"
Xerox 860

**CP/M Conversion Programs**
(as of 10/1/84)

All available with both Wordstar and Text Software.
Action Discovery
Aitle Professional
Almare Sprint (models 1-4)
Alspa
Altos
AOS
Bonsai
British Micro Mimi 803 and 804
Bytec Hyperion
BT Merlin
CAL PC
California CS
Canon AS 1000
CASU
CCS
CDC Cyber 110
Colonial Data
Ceedata
Columbia PC
Columbia Multi Personal
CompuPro 8/16
Control Data 110
Cromenco System 3
Datamac Series 1600
Datapoint 1550
Datapoint 2150
DEC Robin VT 180
DEC Rainbow
Delta Systems
Digitan Addsvery
Dynabyte DB8/4
Eagle 1600
Eagle 160
Epson QX-10
Exidy Sorcerer
EXO
Ferguson Big Board
Gemini
Globe 101
Harris Standard
Heath H8
Heuristicks
Hewlett Packard HP-125
Hewlett Packard HP-87
Hitachi MB-16001
Honeywell Micro System 6/10
Houdaille Stippit
IBC Cadet
IBC H.P. Middi Cadet
IBM PC
ICL DRS 20
ICOM 3712
ICOM 3812
IMS 5000SX
IMS 8000SX
Imsai
ICL PC 15
ICL PC 25
Industrial MS 8000
Intel MDS
Inter Systems Ithaca 800
Interstil Dev Sy
Intertec Superbrain
Intertec Superbrain Super
ISC Intecolor
Ithaca Encore 580
Ithaca Encore 880
Jet
J.L. Bender I
Kaypro II
Kaypro 10
Lambert Duet 16
Leading Edge PC
Logica Vitesse
LSI M3
LSI M4
LSI Octopus
Master Max
Matrox Max-10
Micro-5 Micro General
Micromation
MMC India
Modcomp
Morrow MD1
Morrow MD2
Morrow MD3
Morrow Discus
Mosteck
National MSC 6600
NCR 8140
NCR 9010
NEC PC 8001
NEC PC 8800
Nokia PC
Numeridex
Ohio Scientific
Olivetti M20
Osborne I
Osborne II
PEC
Percom 7800
Pertec PCC
Quasar QDP100
Quay 900
Research Machine
Samurai S-16
Sanyo MBC 2000
Sanyo MBC 1050
Sanyo MBC 4000/4050
Sanyo MBC 3000
SD Systems 200
SD Systems 2000
Seiko 8600
Sharp MZ 808
Shelton Signet
SMC-Seicom 8600
Space Byte
Sperry 10
Sperry 20
Sperry 25
Sperry 30
Sperry 40
Sperry 50
Sumicom 330
Steams Desktop
Tarbell
Tava PC
Televideo 1603
Televideo 802/803
Texas Instruments Professional
Teletek
Toshiba T250
TRS-80 Model I
TRS-80 Model II
TRS-80 2000
Transam Tuscan
Triumph Adler
Typeline Ienni
Typoeline
Univac
Vector Graphics 4
Vector Graphics SX Series
Victor 9000
Wang PC
WangWriter
Xerox 820
Xerox 820 II
Xerox 16/8
Zenith Z-90
Zenith Z-100
Zilog MC22-20

The above are available to ASCII, EBCDIC, TTS or Print Image

Disk-to-D

AM CompEdit to CP/M
AM CompEdit to CPT
AM CompEdit to DEC
AM CompEdit to DECmate II
AM CompEdit to IBM Displaywriter
AM CompEdit to IBM PC
AM CompEdit to MCS
AM CompEdit to NBI
AM CompEdit to Wang OIS 8"
AM CompEdit to Wang OIS 5 1/4"
AM CompEdit to Xerox 860

CP/M to CPT
CP/M to DEC
CP/M to DECmate II
CP/M to IBM Displaywriter
CP/M TO IBM PC
CP/M to MCS
CP/M to NBI
CP/M to Wang OIS 8"
CP/M to Wang OIS 5 1/4"
CP/M to Xerox 860

CPT to CP/M
CPT to DEC
CPT to DECmate II
CPT to IBM Displaywriter
CPT to IBM PC
CPT to MCS
CPT to NBI
CPT to Wang OIS 8"
CPT to Wang OIS 5 1/4"
CPT to Xerox 860

DEC to CP/M
DEC to CPT
DEC to DECmate II
DEC to IBM Displaywriter
DEC to IBM PC
DEC to MCS
DEC to NBI
DEC to Wang OIS 8"
DEC to Wang OIS 5 1/4"
DEC to Xerox 860

DECmate II to CP/M
DECmate II to CPT
DECmate II to DEC
DECmate II to IBM Displaywriter
DECmate II to IBM PC
DECmate II to MCS
DECmate II to NBI
DECmate II to Wang OIS 8"
DECmate II to Wang OIS 5 1/4"
DECmate II to Xerox 860

Editwriter to CP/M
Editwriter to CPT
Editwriter to DEC
Editwriter to DECmate II
Editwriter to IBM Displaywriter
Editwriter to IBM PC
Editwriter to MCS
Editwriter to NBI
Editwriter to Wang OIS 8"
Editwriter to Wang OIS 5 1/4"
Editwriter to Xerox 860

IBM 3740 to CP/M
IBM 3740 to CPT
IBM 3740 to DEC
IBM 3740 to DECmate II
IBM 3740 to IBM Displaywriter
IBM 3740 to IBM PC
IBM 3740 to MCS
IBM 3740 to NBI
IBM 3740 to Wang OIS 8"
IBM 3740 to Wang OIS 5 1/4"
IBM 3740 to Xerox 860

IBM 5520 to CP/M
IBM 5520 to CPT
IBM 5520 to DEC
IBM 5520 to DECmate II
IBM 5520 to IBM Displaywriter
IBM 5520 to IBM PC
IBM 5520 to MCS
IBM 5520 to NBI
IBM 5520 to Wang OIS 8"
IBM 5520 to Wang OIS 5 1/4"
IBM 5520 to Xerox 860

IBM Displaywriter to CP/M
IBM Displaywriter to CPT
IBM Displaywriter to DEC
IBM Displaywriter to DECmate II
IBM Displaywriter to IBM PC
IBM Displaywriter to MCS
IBM Displaywriter to NBI
IBM Displaywriter to Wang OIS 8"
IBM Displaywriter to Wang OIS 5 1/4"
IBM Displaywriter to Xerox 860

IBM Office System 6 to CP/M
IBM Office System 6 to CPT
IBM Office System 6 to DEC
IBM Office System 6 to DECmate II
IBM Office System 6 to IBM Displaywriter
IBM Office System 6 to IBM PC
IBM Office System 6 to MCS
IBM Office System 6 to NBI
IBM Office System 6 to Wang OIS 8"
IBM Office System 6 to Wang OIS 5 1/4"
IBM Office System 6 to Xerox 860

IBM PC MS-DOS Multimate to CP/M
IBM PC MS-DOS Multimate to CPT
IBM PC MS-DOS Multimate to DEC
IBM PC MS-DOS Multimate to Decmate II
IBM PC MS-DOS Multimate to IBM Displaywriter
IBM PC MS-DOS Multimate to MCS
IBM PC MS-DOS Multimate to NBI
IBM PC MS-DOS Multimate to Wang OIS 8"
IBM PC MS-DOS Multimate to Wang OIS 5 1/4"
IBM PC MS-DOS Multimate to Xerox 860

IBM PC MS/DOS Text to CP/M
IBM PC MS/DOS Text to CPT
IBM PC MS/DOS Text to DEC
IBM PC MS/DOS Text to DECmatell
IBM PC MS/DOS Text to IBM Displaywriter
IBM PC MS/DOS Text to MCS
IBM PC MS/DOS Text to NBI
IBM PC MS/DOS Text to Wang OIS 8"
IBM PC MS/DOS Text to Wang OIS 5 1/4"
IBM PC MS/DOS Text to Xerox 860

IBM PC MS/DOS Wordstar to CP/M
IBM PC MS/DOS Wordstar to CPT
IBM PC MS/DOS Wordstar to DEC
IBM PC MS DOS Wordstar to DECmate II
IBM PC MS DOS Wordstar to IBM Displaywriter
IBM PC MS/DOS Wordstar to MCS
IBM PC MS/DOS Wordstar to NBI
IBM PC MS/DOS Wordstar to Wang OIS 8"
IBM PC MS/DOS Wordstar to Wang OIS 5 1/4"
IBM PC MS/DOS Wordstar to Xerox 860

Lanier No Problem to CP/M
Lanier No Problem to CPT
Lanier No Problem to DEC
Lanier No Problem to DECmate II
Lanier No Problem to IBM Displaywriter

# Programs

Lanier No Problem to IBM PC
Lanier No Problem to MCS
Lanier No Problem to NBI
Lanier No Problem to Wang OIS 8"
Lanier No Problem to Wang OIS 5 1/4"
Lanier No Problem to Xerox 860

Micom to CP/M
Micom to CPT
Micom to DEC
Micom to DECmate II
Micom to IBM Displaywriter
Micom to IBM PC
Micom to MCS
Micom to NBI
Micom to Wang OIS 8"
Micom to Wang OIS 5 1/4"
Micom to Xerox 860

NBI to CP/M
NBI to CPT
NBI to DEC
NBI to DECmate II
NBI to IBM Displaywriter
NBI to IBM PC
NBI to MCS
NBI to Wang OIS 8"
NBI to Wang OIS 5 1/4"
NBI to Xerox 860

Olivetti to CP/M
Olivetti to CPT
Olivetti to DEC
Olivetti to DECmate II
Olivetti to IBM Displaywriter
Olivetti to IBM PC
Olivetti to MCS
Olivetti to NBI
Olivetti to Wang OIS 8"
Olivetti to Wang OIS 5 1/4"
Olivetti to Xerox 860

Philips to CP/M
Philips to CPT
Philips to DEC
Philips to DECmate II
Philips to IBM Displaywriter
Philips to IBM PC
Philips to MCS
Philips to NBI

Philips to Wang OIS 8"
Philips to Wang OIS 5 1/4"
Philips to Xerox 860

Siemens to CP/M
Siemens to CPT
Siemens to DEC
Siemens to DECmate II
Siemens to IBM Displaywriter
Siemens to IBM PC
Siemens to MCS
Siemens to NBI
Siemens to Wang OIS 8"
Siemens to Wang OIS 5 1/4"
Siemens to Xerox 860

Syntrex to CP/M
Syntrex to CPT
Syntrex to DEC
Syntrex to DECmate II
Syntrex to IBM Displaywriter
Syntrex to IBM PC
Syntrex to MCS
Syntrex to NBI
Syntrex to Wang OIS 8"
Syntrex to Wang OIS 5 1/4"
Syntrex to Xerox 860

Tel-Ekonomi to CP/M
Tel-Ekonomi to CPT
Tel-Ekonomi to DEC
Tel-Ekonomi to DECmate II
Tel-Ekonomi to IBM Displaywriter
Tel-Ekonomi to IBM PC
Tel-Ekonomi to MCS
Tel-Ekonomi to NBI
Tel-Ekonomi to Wang OIS 8"
Tel-Ekonomi to Wang OIS 5 1/4"
Tel-Ekonomi to Xerox 860

Vydec to CP/M
Vydec to CPT
Vydec to DEC
Vydec to DECmate II
Vydec to IBM Displaywriter
Vydec to IBM PC
Vydec to MCS
Vydec to NBI
Vydec to Wang OIS 8
Vydec to Wang OIS 5 1/4"
Vydec to Xerox 860

Wang OIS 8" to CP/M
Wang OIS 8" to CPT
Wang OIS 8" to DEC
Wang OIS 8" to DECmate II
Wang OIS 8" to IBM Displaywriter
Wang OIS 8" to IBM PC
Wang OIS 8" to MCS
Wang OIS 8" to NBI
Wang OIS 8" to Wang OIS 5 1/4"
Wang OIS 8" to Xerox 860

Wang OIS 5 1/4" to CP/M
Wang OIS 5 1/4" to CPT
Wang OIS 5 1/4" to DEC
Wang OIS 5 1/4" to DECmate II
Wang OIS 5 1/4" to IBM Displaywriter
Wang OIS 5 1/4" to IBM PC
Wang OIS 5 1/4" to MCS
Wang OIS 5 1/4" to NBI
Wang OIS 5 1/4" to Wang OIS 8"
Wang OIS 5 1/4" to Xerox 860

Wang PC to CP/M
Wang PC to CPT
Wang PC to DEC
Wang PC to DECmate II
Wang PC to IBM Displaywriter
Wang PC to IBM PC
Wang PC to MCS
Wang PC to NBI
Wang PC to Wang OIS 8"
Wang PC to Wang OIS 5 1/4"
Wang PC to Xerox 860

Wordplex to CP/M
Wordplex to CPT
Wordplex to DEC
Wordplex to DECmate II
Wordplex to IBM Displaywriter
Wordplex to IBM PC
Wordplex to MCS
Wordplex to NBI
Wordplex to Wang OIS 8"
Wordplex to Wang OIS 5 1/4"
Wordplex to Xerox 860

Xerox 860 to CP/M
Xerox 860 to CPT
Xerox 860 to DEC
Xerox 860 to DECmate II
Xerox 860 to IBM Displaywriter
Xerox 860 to IBM PC
Xerox 860 to MCS
Xerox 860 to NBI
Xerox 860 to Wang OIS 8
Xerox 860 to Wang OIS 5 1/4

November 1984

The Office
Magazine of Management • Equipment • Automation

# Cleaning Up In the Media Conversion Game

By Peter Siebert

The idea of transferring information between two incompatible word processing or computer systems was relatively novel a few years ago. Most computer vendors offered some data communications options, but when it came to actually sending text from one type of unit to another, they were unable to provide much help. The enterprising office manager or computer applications specialist who, through trial and error, effected a marriage of units was a real pioneer. Just to get the words transferred was considered a real accomplishment.

Now the situation has changed. Every vendor boasts of his product's communications abilities and terms like "networking" and "main-frame-compatible" buzz through the industry. Data is routinely passed from one computer to another, but life, as usual, just seems to have gotten more complex.

### Computers, Computers

First, there are many more types of computers to deal with. Where once an office had just one or two systems, now there seems to be a different one in every department. On top of all that, top management has taken a shine to personal computers, introducing more problems, since everyone has a different software package, spreadsheet or data base. Data is constantly moving from one system to another. This is where media conversion comes in.

Media conversion means the transfer of information from one type of storage medium to another. Its aim is to allow information that has already been captured in some computer-readable form to be conveniently moved to another system without having to retype it. If the computer industry was as standardized as the phonograph industry, media conversion would be a simple matter. But computer designers are always coming up with a better mousetrap to revolutionize the industry. We need look no farther than the wrangling over standards for 3½" (or will it be 3¼"?) micro drives to see that system incompatibility is going to remain a headache.

### Treating a Malady

Until recently, the only treatment for this malady was to wire two systems together, either directly or over the phone, and telecommunicate the information. While this method saves typing, it still has plenty of drawbacks. Making the connection can be a hassle, personnel are tied up, transmission rates are slow and the results are often less than ideal.

As an alternative to direct telecommunications, there is a bewildering array of products being marketed to facilitate all this moving of data and, presumably, improve the results. There are optical character readers that accommodate typewritten text and turn it into computer codes, protocol converters that bring together systems with irreconcilable differences, disc readers that accept discs from a variety of systems, and disc-to-disc converters that spend all day automatically converting. Some devices even combine the capabilities of several of these products to give you even more flexibility and options.

With these new products and ongoing enhancements to existing ones, media conversion is no longer as difficult to accomplish as it once was. But life still doesn't seem to be getting any easier. Given the number of interconnections and combinations that must be dealt with, and the smorgasbord of conversion options to consider, how do you go about choosing the right one? There are the usual considerations of cost, convenience, speed and accuracy. And you want to be sure you're getting systems which are flexible enough to permit added capabilities as needs change. There's another consideration which directly relates to all of the above: quality of conversion.

Media conversion is a little like language translation. You can't perform word-for-word translation without losing some shades of meaning. The goal is to get the translated information to look right and work right, too; to preserve the sense without sacrificing the poetry.

Three factors determine what you can ultimately expect from a conversion.

(Continued)

*PETER SIEBERT, a consultant at Altertext, Inc., Boston, Mass., is an authority on media conversion and telecommunications.*

First is the type of text to be transmitted. Clearly, a document that is just blocks of text with no complicated formats, boldfacing, superscripts or special characters is going to cause fewer problems than one containing massive wide-format statistical charts or scientific equations.

Second is the nature and capabilities of the two systems you're converting between. Just about every one handles the alphabet and common punctuation the same way. But when you examine how more complicated things such as decimal tabs, underscoring, and indentation are handled, each system does it differently. For any given feature, the more similar the systems are in how they operate, the better the results can be.

If you're converting from a system that is relatively unsophisticated and doesn't have a lot of special print features or command codes, it's difficult to add in sophistication.

The third factor is the method of conversion. Each method has its own strengths and weaknesses, and determining the best procedure often depends on the first two factors described above. Furthermore, similar types of products vary widely in sophistication. For example, scanning machines run the gamut from a simple system that only recognizes one font and basically just captures the keystrokes to one that can read virtually any font and insert format commands, giving a much cleaner product. As a general rule, direct telecommunications gives the least satisfactory results, primarily due to the limitations of most systems' communications capabilities. The addition of a protocol converter may allow you to take advantage of point-to-point protocols which most computers have for communicating files to their own kind. This will greatly enhance the results of your conversion. Direct disc-to-disc conversions, since they're freed from the limitations of any particular system's communication capabilities, offer an even greater potential for clean conversion.

The best way to analyze conversion options is to gather some sample documents, familiarize yourself with the systems you're dealing with, and run some test conversions.

From the point of view of cleanup, there are several common problem areas to concentrate on: document format information, line-end codes, tab commands, underscoring and boldfacing, and special symbols. No conversion can be expected to handle them all, but there is much that can be done to lessen the impact of what doesn't get converted. There's no reason why you should accept the inadequacies of a conversion without asking if something couldn't be done differently to make cleanup easier.

Document formats, sometimes called rulers, contain information on margin settings, tab positions, vertical spacing and justification. Depending on the nature of the system that is receiving converted data, having this information transferred can be important. If the information is primarily just basic text with standard margin settings and tabs set every five spaces, format information may not be that critical since it can be easily added at the receiving end.

On the other hand, if the text is statistical, with wide margins and oddly spaced columns, or a mixture of text and statistical, then having the appropriate margin and tab settings transmitted becomes much more important since it can save a lot of guesswork in determining tab positions and unscrambling columns. You should also be prepared for the fact that some word processing programs do not store format information with their documents at all, or the stored information may not necessarily correspond to what was typed on the page. This is especially true of many of the programs being used on personal computers.

Proper conversion of line-end codes is the one area that can have the most impact on workability of converted data. Most word processors have a word-wrap feature that allows the user to add or delete text and then readjust everything to the appropriate margins. They may use one code for a "soft" return, one that allows the line end position to be adjusted as text is added or subtracted, and another for a "hard" return which fixes a line-end at that point.

Conversion of documents between systems of the same school is usually not problematical. Remember that if you are transmitting tab codes but not the correct format information, the documents may appear perplexingly jumbled at first. This is one time when initial appearances can be deceiving. Often a few changes to the document format to add tab stops at the appropriate points will immediately cause things to look much better.

To convert documents between systems belonging to different schools requires complex processing since translating from one that uses a single code to one that uses space-fill requires expansion of that single code into the appropriate number of spaces. This is sometimes called page-image processing. Going the other direction requires that all those spaces be turned into the appropriate tab code or else doing it as part of the cleanup procedure. Obviously a conversion that takes care of this for you automatically is preferable.

Underlining, boldfacing and super and subscripts present fewer serious problems, but they can still cause annoying cleanup work. A common method for transmitting underlined text is to send a backspace and underscore after each character. Many systems handle this very well through communications. If your system ues a code for begin-and-end underscore or an underscore-the-previous-word code, you may find that you will have to remove the backspace/underscore combination and put in the correct codes.

Fortunately, many communications programs allow the user to tailor their translation tables to permit transmission and reception of non-standard codes. The only hitch is that one system may have characters that the other doesn't. In this case it's nice to be able to automatically translate them into some substitute string which can then be searched-out for processing later. Again, some methods of conversion will give you more options.

### Factors to Juggle

There are a lot of factors to juggle when dealing with media conversion. That's what makes it a game. And while advances are constantly being made in equipment to make data translation faster, more complete, and more convenient, the burden is still on the consumer to understand his or her needs and choose the appropriate technology to get the job done. By starting with an understanding of what constitutes unnecessary cleanup, you'll be better able to make that choice. ID

Reprinted with permission,
The Office, November 1984

January 3, 1985

Rob Savoie
Vice President of Engineering
Tele-Sensory System
P.O. Box 7455
Mountain View, California 94039

Dear Mr. Savoie:

Please find enclosed the information you requested about the Interpreter CCU. Our product allows dissimilar word processing systems and personal computers to exchange documents. Now, different systems can truly coexist in the same office. The Interpreter system is unique and revolutionary in that all control characters are converted, creating a document that is fully editable and indistinguishable from a document created on the receiving system. Document "clean-up" normally associated with conversion is eliminated.

The information enclosed details the Wang/NBI conversion software which is currently being distributed. At the recent Comdex show in Las Vegas, we introduced two new software packages allowing full conversion between Wang systems and IBM PCs using Multimate or Wordstar-- the two most widely used word processing packages on the IBM PC. The Wang/Multimate package is now available; the Wang/Wordstar will be available in a couple of weeks. Additionally, a Wang/CPT conversion package will be available by the middle of January. Interpreter Inc. has plans to aggressively continue to develop and distribute conversion packages for other word processing systems.

Thank you for your interest in Interpreter, and I look forward to talking with you further about how we can solve your system incompatibility problems. If I can be of any additional assistance, please call.

Sincerely,

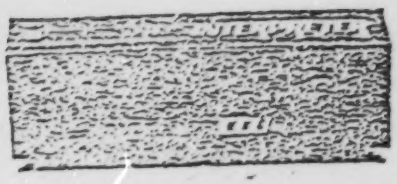
Daryl S. Crane
Western Dealer Area Manager

DC/js
Encls.



[illegible] WEST 46TH AVENUE • WHEAT RIDGE, COLORADO 80033 • (303) 431-8701

# Interpreter CCU For Document Transfer Between Different OA Systems



Documents that are transferred between different brands of word processors and other office automation equipment very often look surprisingly different from the original documents that were input. This is due to the incompatibility of the equipment, and it's a tricky problem.

In some cases, underscores do not come out underscored. In other cases, multicolumn codes are not transferred, running together a set of multiple columns.

Documents with these problems need to be "cleaned up," or reformatted by the receiver. This means that an operator must sit at a terminal and go through the text laboriously, line by line, reinserting the appropriate format codes.

Format and Protocol Conversion

The reason behind these problems is that the "control" characters — the ones that designate page format — usually aren't the same from one vendor's equipment to another. Personal computers, word processors and printers all use different format controls, and very rarely will they communicate without creating some format translation problems.

The Interpreter CCU (communications control unit), from Interpreter, Inc., eliminates these problems. The CCU is an interpretation device for office automation systems document transfer. It interprets document format as well as converts protocol.

The Interpreter CCU operates on the principle of using a unique software program for each office automation vendor data transmission direction (receiving and transmitting). In other words, one program transmits text from Vendor A's to Vendor B's equipment while another unique program transmits text from Vendor B's to Vendor A's terminals. The Interpreter CCU achieves maximum accuracy by buffering enough text as is necessary for analysis, interpretation and transmission.

Interpreter CCU Features

The Interpreter CCU is a self contained tabletop 16-bit computer system with 128K of memory. It allows three indepenent conversion/transmission sessions to occur simultaneously. The CCU is equipped with two 5¼ inch double-sided, double-density floppy disk drives. The left disk drive (Drive A) is dedicated to the system software and the right disk drive (Drive B) is available for store/forward capabilities.

The Interpreter CCU is configured with six serial RS-232 connectors, up to three of which may be bisynchronous with the remaining connectors being asynchronous. This allows the device to easily accommodate the transmission from one vendor's asynchronous machine to another vendor's bisynchronous machine, or asynchronous to asynchronous or bisynchronous to bisynchronous. The protocol conversion takes place simultaneously with the document format interpretation.

Interpreter CCU Code Conversion Process

Every office automation vendor's system has its own communication protocol that allows its system to communicate documents to other like systems with all of its own special format codes preserved and with its own error correction and detection process. The Interpreter CCU uses these same communication protocols in its conversion process to deliver transmitted data to dissimilar office automation systems in their own format. For example, text from a Wang word processor being sent to an NBI will be converted to NBI format codes as it passes through the Interpreter CCU.

Differences between office automation equipment range from protocol to format capabilities to baud rates. The Interpreter CCU is designed to handle all these types of conversion.

Another key feature of the Interpreter CCU's, conversion process is function simulation. If, after buffering and analysis, the Interpreter CCU determines that the function called for in the text being sent is not available on the receiving vendor's device, the Interpreter CCU will simulate that funciton with the closest equivalent function on the receiving device. For example, when a document with the "paragraph break key" control code is transmitted through an Interpreter to a receiving device without a "paragraph break key" the CCU analyzes the text and simulates the "paragraph break key" with equivalent functions, such as line feeds and spaces. The end result is that the receiver's document has a paragraph break in the correct place in the document -- just as the receiver had in the original document.

Equipment Configuration

A typical configuration involving the Interpreter CCU consists of six office automation systems — one system for each of the CCU's RS-232 serial ports.

Once the hardware and cables have been connected to these ports, the user must define the Interpreter CCU functions. Any asynchronous terminal can display the Interpreter CCU "menu." The menu allows the user to select appropriate baud rates, transmission direction, vendor specification, software, etc.

Each conversion/transmission process involving the Interpreter CCU may take any one of the following forms:

- port to port
- port to diskette
- diskette to port

Interpreter CCU Compatibility

The following list shows office automation equipment for which proprietary Interpreter CCU software is available. Software to service other brands will be announced shortly.

IBM PC/WordStar, MultiMate
Wang OIS 50, 60, VS
NBI 3000, 4000, System 8 and 64
CPT (December 15 release)

For more information contact: Martin Steinberg, Interpreter, Inc., (303) 431-8991

PC WEEK

DECEMBER 18, 1984
VOL. 1 NO. 50 $2.95

THE NATIONAL NEWSPAPER OF IBM STANDARD MICROCOMPUTING



# Interpreter Translates 'WordStar,' 'MultiMate'

WHEAT RIDGE, CO—Interpreter Inc.'s Interpreter communications-control unit (CCU) now supports *WordStar* and *MultiMate* word-processing packages.

The $16,000 CCU connects as many as six different PCs, word processors or other office-automation devices, a spokesman for the company said.

Each CCU contains programs for translating and exchanging documents among Wang, IBM and NBI systems.

Each system connects to one of the CCU's six communications ports. As many as three translation/transmission sessions can occur simultaneously. All of the systems can print files on a Xerox laser printer.

"The Interpreter CCU fills a real need because it lets different vendors' office-automation equipment coexist," said Martin Stein, senior vice president at Interpreter.

"Customers can select the most suitable brand of equipment for their specific needs, regardless of its ability to communicate with existing office systems."

## Wave of the Future?

The multivendor approach is gaining popularity as many vendors are working to connect incompatible systems.

Several vendors are taking a different approach from Interpreter, concentrating on the mainframe.

Network Applications and Software Research Corp. are both working with IBM's *Distributed Office Support System* (*DISOSS*) to link office-automation systems from Wang, Digital Equipment Corp., IBM and Data General.

Interpreter Inc. is located at 11455 W. 48th Ave. Wheat Ridge, CO 80033 (800) 232-INTP. ■

AUGUST 1, 1984 EMMS VOL. 8, NO. 15

Ideal For Electronic Mail: A major potential application for Interpreter is in sending electronic mail. MCI Mail, for example, is searching for the right way to link word processors into its service so that 1) companies with different machines can use them with MCI's nationwide laser printer network and 2) non-compatible machines can communicate from mailbox to mailbox. Is Interpreter the machine that can make this happen for MCI and other services, such as Easylink?

Interpreter already has six communication ports and can receive at speeds from 300-4,800 bps. With an appropriate interface, users could dial the word processor port, identify the type of file being transmitted and the receiving machine (or laser printer) and Presto!

While it's too early to tell if Interpreter will be the product to break the market wide open, it's clear enough that the electronic mail companies would welcome some way of being able to handle formatted traffic from both personal computers and word processors.

As we've written before, there's a real problem going from word processors today to e-mail systems, not only because formatted files can't be handled, but because they often must be converted to ASCII before transmission, which adds even more overhead to the process. Like everyone else, we hope Interpreter matches its claims.

Flagstaff Engineering
Box 1970
Flagstaff, Arizona 86002

gstaff Engineering®
970 • Flagstaff, AZ 86002 • (602) 774-5188 • TELEX 705609

ata Conversion Systems
02) 774-5188 • TELEX 705609

Barry Bryant
Marketing

January 15, 1985

Rob Savoie
Telsenory Corporation
Mountain View, CA. 94039

Dear Mister Savoie,

Thanks for your inquiry today regarding our product. The enclosed information will give you an idea of our product line.

Our company has developed an easy-to-use diskette system that can read and write diskettes from most word processing and computer systems. In the last three years, we have installed over two thousand systems in the U. S. and many foreign countries. Our system will provide accurate reading and writing of data files or text documents on 8"or 5" diskettes using your IBM PC, XT, or AT. The transfer rate for data files is 10,000 bytes per second and for text documents is two seconds per page.

Our system includes a Data Interface Unit containg a single 8" diskette drive and a special controller card with cable. The programs include systems diagnostics, DOS device drivers, and utilities to use the 8" diskette as a large capacity DOS drive.

The price of our single drive system is $1100. The price of each software module is $695. See our attached data sheet for a description of the software modules that are available.

Please let me know if you have additional questions or would like to arrange a conversion test for one of your diskettes.

Very truly yours,

Barry Bryant

Barry Bryant
Marketing

LAGSTAFF ENGINEERING
P.O. BOX 1970
FLAGSTAFF, ARIZONA 86002

The DISPLAYWRITER CONNECTION
distribution diskette contains:

| | |
|---|---|
| BIGDISK | DOS 2.0 Device Driver |
| BIGFMT | 1.2 Mbyte disk formatter |
| ALIGN8 | R/W Diagnostic. (Requires Digitized Alignment Diskette) |
| CHECK8 | Read/Write Diagnostic |
| VERIFY8 | Read/Verify Diagnostic |
| DISPLAY8 | Display diskette sectors |
| DWSFMT | Format a blank Displaywriter Diskette |
| DWFTOPC | Copy a Reportpack File to PC |
| DWSTORF | Copy a Textpack File to Revisable Format Text.(Displaywrite 2) |
| RFTODWS | Copy a Revisable Format file to Text pack |
| RFTOMM | Convert a revisable format file to a Multimate file. |
| MMTORF | Convert a Multimate file to a revisable format file. |
| WSTORF | Convert a Wordstar file to a revisable format file. |
| RFTOWS | Convert a revisable format file to a Wordstar file. |
| DOCUMENT | System Documentation |
| TRACK5 | Read Diagnostic for 5 1/4" Drive |
| CAT | Diskette Catalog |
| ASCTORF | Convert a Ascii file to a revisable format file. |
| RFTOASC | Convert a revisable file format to a Ascii format |

## PRODUCT DESCRIPTION

The "FILE CONNECTION" is an 8" diskette subsystem for use with an IBM PC or XT to accomplish transfer of source, data and/or word processing files between the IBM PC and 8" diskettes created by a multitude of other systems.

The subsystem is comprised of one or two 8" drives in a powered cabinet, a drive connect cable, software and a floppy disk controller card capable of handling two 5¼" drives and two 8" drives. The card replaces the existing floppy disk controller, adding the 8" drive capability while maintaining the 5¼" drive performance.

## SOFTWARE DESCRIPTION

The device driver, in conjunction with a DOS format routine allows usability of the 8" drive as a 1.2 Mbyte DOS logical device. Program files may be executed from the drive, data may be stored upon it or it may be used to backup a hard drive with the DOS BACKUP/RESTORE function.

The "FILE CONNECTION" software reads, writes and formats the majority of 3740 and 3741 formats, either single or double sided, in sector sizes of 128, 256, 512, and 1024 Bytes. This gives the ability to read or write any 8" Basic Data Exchange or Standard Data Interchange Format, as qvll as the ability to read, write, and format many mini, mainframe and S-100 system formats. There is an 8" MSDOS format routine which formats a single-sided, single density standard MSDOS diskette. The driver is written to allow reading of and writing to an MSDOS diskette under PCDOS (2.0 or 2.1). There are routines to move PCDOS 2.0 and 2.1 formatted 5¼" diskettes to DPM86 formatted diskettes and the converse. There are routines to transfer files from DATAMASTER, TRSDOS AND DEC RT-11 (RX01) diskettes into DOS format. There are programs to read from 8" absolute sectors into DOS and back and a routine to duplicate an 8" diskette.

The "WORD CONNECTION" software transfers data from NBI, CPT, OS/6 and DISPLAYWRITER to Revisable Format Text or an ASCII Text file. Revisable Format Text files may then be taken directly into DISPLAYWRITER 2. There are programs to transfer RFT files to Wordstar or Multimate and the converse. There are routines to format and write back to DISPLAYWRITER or CPT diskettes. There are more modules in process scheduled to be released. Call us with your needs!

## HARDWARE DESCRIPTION

The drives are Mitsubishi M2896 Thin-line 8" drives selected for their precision, reliability and performance. The direct drive DC stepmotor insures their accuracy and solves the problem of line voltage or frequency variations. The power supply is a standard 5 and 24 volt arrangement requiring 115 or 230 VAC, 50-60MZ. The unit draws 40W. The drive connect cable is a 50 conductor ribbon cable. The floppy disk controller card is our own design.

## PRICES OF FLAGSTAFF ENGINEERING, INC.

| | |
|---|---|
| DATA INTERCHANGE UNIT<br>DIU-1 ---- 8" Single Drive ..... | $ 1100.00 |
| DATA INTERCHANGE UNIT<br>DIU-2 ---- 8" Double Drive ..... | 1800.00 |

SOFTWARE:

| | | | |
|---|---|---|---|
| "FILE CONNECTION"<br>Includes systems diagnostics, DOS device drivers<br>Large capacity DOS DRIVER, Format utilities and<br>Transfer utilities ..... | | | 695.00 |
| "WORD CONNECTION"<br>Includes systems utilities, DOS device drivers<br>Large diskette transfer utilities | | | |
| | Displaywriter | (Read/Write/Format) | 695.00 |
| | CPT | (Read/Write/Format) | 695.00 |
| | NBI | (Read only) | 695.00 |
| | OS6 | (Read only) | 695.00 |
| "OTHER CONNECTION"<br>CP/M, DEC, TRSDOS, EDX, Wordstar, Multimate,<br>Xerox 820 | | (EACH) | 195.00 |

Flagstaff Engineering®

Box 1970 • Flagstaff, AZ 86002 • (602) 774-5168 • TELEX 705609

## Select the Communications Option That's Right for You.

### Itek MultiDisk Reader (MDR)

Material generated on word processors without communications capability can still be typeset without rekeyboarding via the Itek MultiDisk Reader.

The MultiDisk Reader is an intelligent tabletop translation device that decodes and transfers text from the disk media of word processors, computers and typesetters, to the disk media of other "incompatible" word processors, computers and typesetters. It can be used with most photolypesetters or word processors that have communication capability.

As a result, you –

- save keystrokes
- eliminate rekeying
- minimize reproofing tasks
- save up to 60% of the time normally needed for typesetting
- increase productivity
- maintain document confidentiality

Commercial typographers can expand their business by doing typesetting for customers with word processors. This enables them to offer low cost typesetting services while improving profit margins.

In-plant repro departments can expand their services to satisfy the typesetting requirements of word processing user departments or by making different word processors compatible with each other.

Since the MDR converts material stored on disks, it does not tie up word processor or computer stations, or operators during the transfer process. And the MDR can transfer up to 9600 Baud, or about 1000 characters per second, making it ideal for high volume users.

Other important MDR features:

- microcomputer automatically performs all file handling and converting functions.
- accepts 5¼" or 8" disks; hard or soft sectored.
- accepts single or dual density, single or double sided disks.
- eliminates corrupted type which could be caused by transmission irregularities.
- interprets disks from most common systems via software reading programs loaded from mini floppy disks (see specifications for list of available pr ams).

### Itek Data Communications (IDC)™ Interface

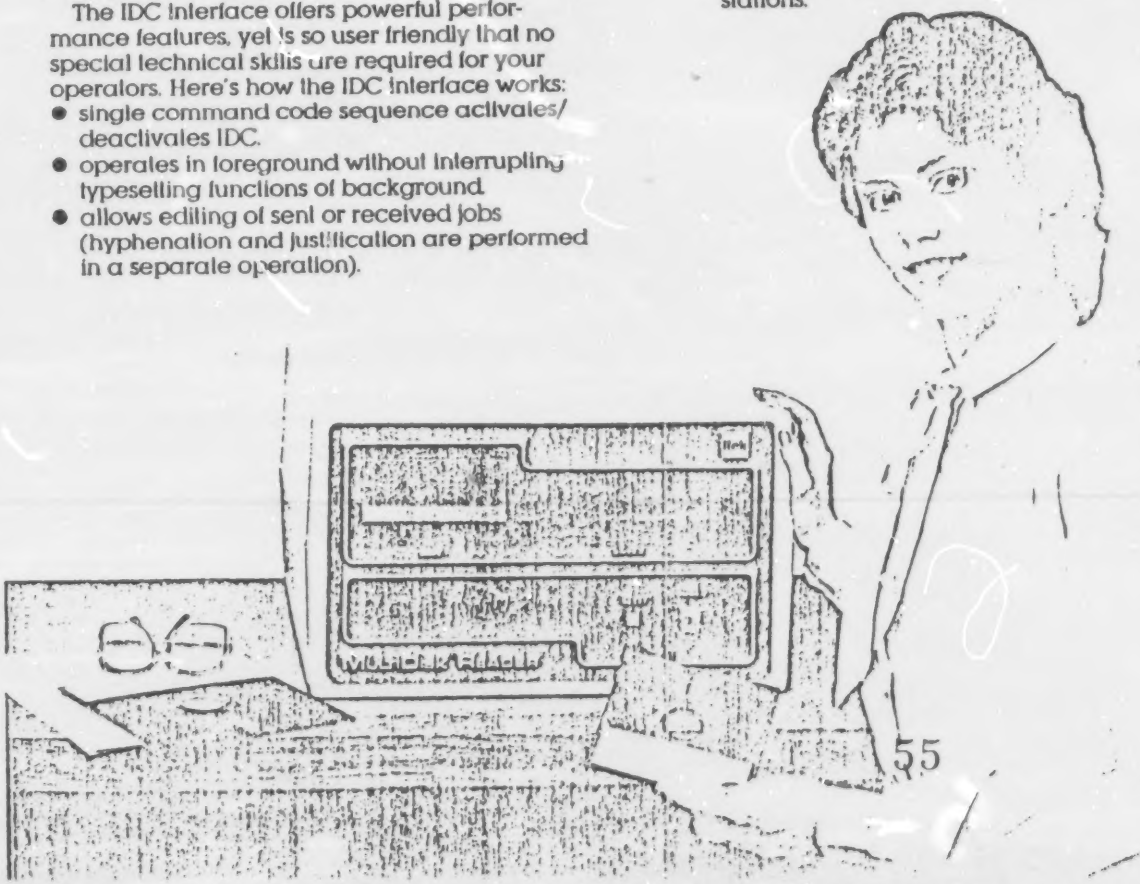
The IDC interface loads into any Quadritek terminal, enabling it to electronically receive copy and format information from most word processors or computers.

By capturing keystrokes from other systems, the IDC interface:

- eliminates rekeyboarding and minimizes proofreading tasks.
- cuts typesetting time up to 60%.
- improves turnaround and overall productivity.
- maintains confidentiality of sensitive documents.
- offers inplant repro departments a way to increase services.
- opens new profit areas to commercial shops.

The IDC interface offers powerful performance features, yet is so user friendly that no special technical skills are required for your operators. Here's how the IDC interface works:

- single command code sequence activates/deactivates IDC.
- operates in foreground without interrupting typesetting functions of background.
- allows editing of sent or received jobs (hyphenation and justification are performed in a separate operation).
- operating parameters are stored on disk data files. User selects desired parameters from on-screen menu.
- automatically converts any of 128 ASCII codes into Quadritek compatible codes.
- automatically converts up to 150 information strings.
- communicates bi-directionally with computers.
- transfers data at selectable speeds from 50-9600 Baud.
- will direct input to the Editor/Text Buffer or store material on disk for later editing/typesetting.
- telecommunicates via standard modems or accoustic couplers at sending and receiving stations.



# Document conversion.

## The old way.

### Rekeying.

Rekeying is the simplest method of document conversion between incompatible word processors. Its major drawback is that it requires a skilled operator, demands time-consuming proofing and ties up an important work station during the process.

### Modems.

Modems can transfer text between incompatible systems in minutes. But usually can't transfer the formatting and control codes...resulting in costly document cleanup. Modems also tie up 2 word processing stations during transmission.

### Optical Character Readers.

Optical Character Readers (OCRs) require a hard copy printout before the target system can receive the document. Also, incompatible typefaces won't transfer. And, like modems, OCRs often necessitate cleanup before a document can be revised on the new system.

### Service bureaus.

Service bureaus charge as much as $110 to convert diskettes. They also pose a security risk for confidential material, since diskettes have to leave your offices to be converted.

## The new way.

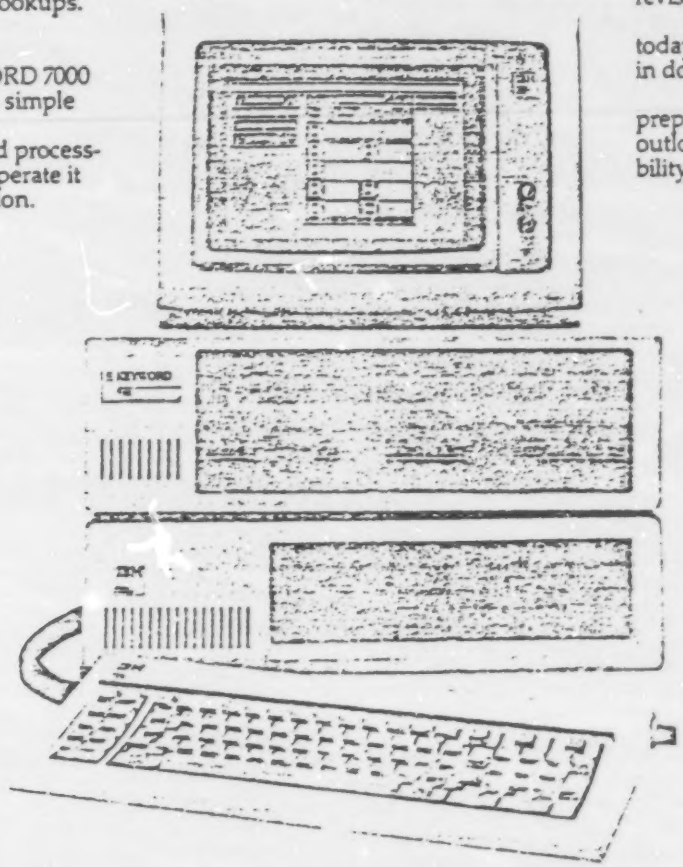
Say hello to the KEYWORD 7000.

Say goodbye to rekeying headaches. Hard copy printouts. Telecommunication hookups. Service bureau prices.

And document cleanup.

That's because the KEYWORD 7000 has made document conversion simple and reliable.

So simple, your entire word processing department will be able to operate it with just a few minutes instruction.

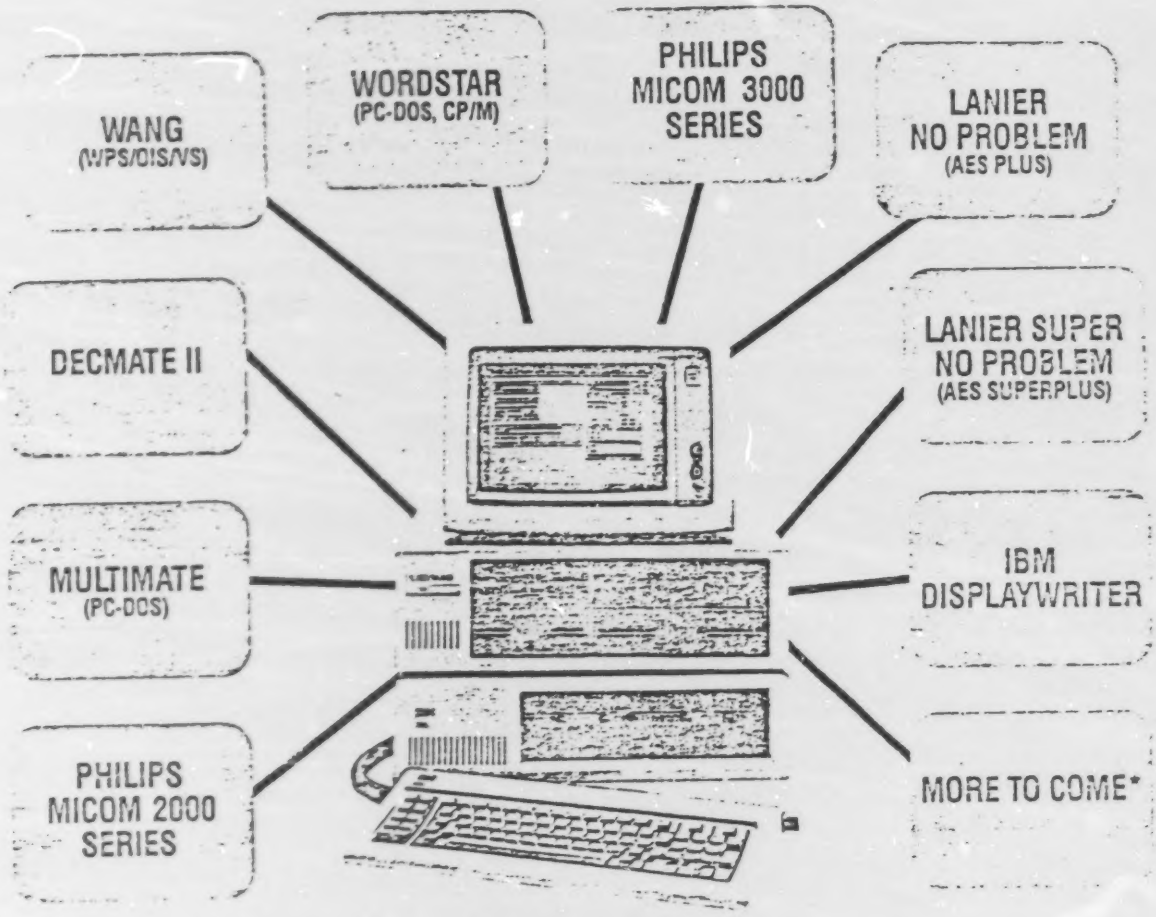


And so reliable, it can convert a diskette from one word processor to another with unheard-of fidelity. With complete revisability. Without cleanup.

It's easy to find out more about today's revolutionary breakthrough in document conversion.

Just turn the page. And be prepared to change your whole outlook on office system incompatibility.

# The KEYWORD 7000 converts diskettes between all of these major vendors.




That's 90 different word processor-to-word processor combinations! With more on the way soon.

You get the software pairing of your choice when you receive your KEYWORD 7000.

And should you require additional pairings – if you need to interchange between systems or if you have more than 2 incompatible word processors – all you have to do is buy an additional software pairing.

Now, wouldn't you like to discover for yourself just how easy it is to let the KEYWORD 7000 take the nightmare out of office system incompatibility?

You can arrange for a personal, no obligation demonstration of the KEYWORD 7000 by calling toll-free: 1-800-227-1817, extension 8048.

Or by completing and returning the attached business reply card.

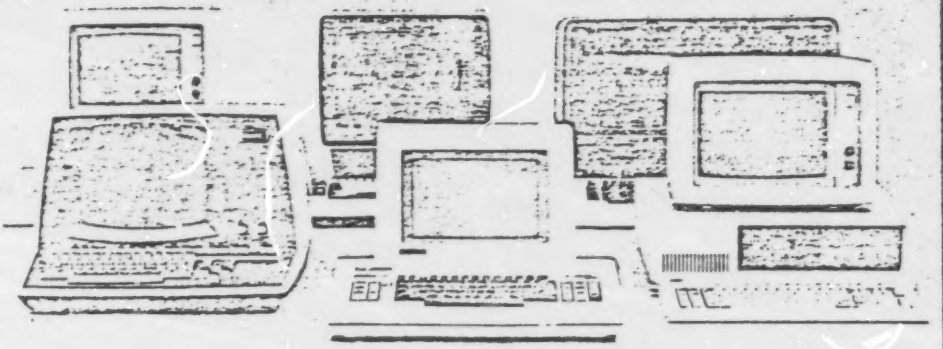
Either way, it will be your biggest step toward solving your document conversion crisis.

*Xerox 820 850 860 • NBI • IBM 5520 • IBM OS 6 • IBM Displaywrite II • Convergent Technologies

KEYWORD 7000 are trademarks of Keyword Office Technologies, Inc.

# You've invested a lot of money in multi-vendor office systems.

## Making it all work together requires just one thing.



# Soft-Switch.™

# Soft-Switch Communicates.

The idea seems simple enough: connect all of your office systems so that documents can be freely interchanged for editing, storage, display, and printing. That includes word processors, PCs running word processing packages, and mainframe terminals accessing DCF and PROFS.

Many vendors claim to connect multiple vendors' equipment through "protocol translation." And connect they can, but no communicate. To really communicate requires transforming the document coding so that it is fully editable at the receiving system. After all, what good is it to transmit a document to a different workstation if that workstation can't manipulate the document once it's there?

## Soft-Switch is compatibility.

The Soft-Switch is a program product for your IBM mainframe (MVS or VM) that allows users to send documents to other users with document translation performed automatically, to store documents in mail libraries, and to retrieve documents from these libraries.

Soft-Switch communicates with IBM, Wang, Xerox, and NBI. It communicates with the MultiMate word processing program on the IBM PC, with DCF, and with PROFS; with the IBM 6670 laser printer; and with standard plain copy printers.

Soft-Switch is totally consistent with evolving standards for office systems interface. Soft-Switch integrates multi-vendor office environments by first translating a document into IBM's Level 2 Document Content Architecture (DCA), and then into the exact format required by the receiving workstation.

## Soft-Switch solves today's problems.

Let's say an analyst prepares a document on his PC with MultiMate. He executes Soft-Switch (much as he would any other PC program) and specifies distribution to his secretary and to the 6670 laser printer down the hall. Soft-Switch provides the mainframe link that transports the document from the PC to the IBM host, translates the document from MultiMate format to DCA, translates the DCA format to Wang's WPS format and the IBM 6670 laser printer's DCF format, and routes the documents to their final destinations.

Another example: a document is prepared on a Xerox word processor at Detroit headquarters and must be sent to a user at a Wang word processor in New York for further editing and printing, and to an IBM Displaywriter user in Tampa for review. The Xerox operator simply transmits the document to Soft-Switch at the IBM host and instructs Soft-Switch to route the document to the New York user and to the Tampa user. Through its directory, Soft-Switch recognizes that the sender and receivers are using different word processors, and automatically translates the Xerox document into DCA, and thereafter into Wang and Displaywriter formats. The resulting documents are then routed to the recipients.

## Soft-Switch— a path to tomorrow.

Soft-Switch is the first (and only) Document Control System to help you effectively manage a multi-vendor office systems environment. In addition to translation services, Soft-Switch provides comprehensive electronic document distribution services and electronic library services. Already installed at many *Fortune* 100 companies, Soft-Switch integrates the technologies of protocol translators, text management systems, micro/mainframe links, message switches, and electronic mail systems to provide organizations with integrated office systems.

It's a product you need today, and will no doubt need even more tomorrow. Give us a call—before you're swamped.

Information Technologies Inc.
201 North Warner Road
King of Prussia, PA 19406
(215) 768-9430
telex 46-0610

TO: Department of Education Word Processing Study File

FROM: John

DATE: January 15, 1985

RE: D-CODE FROM WORTHMAN ASSOCIATES IN PALO ALTO

---

According to Barry Green, their system currently is for Xerox 860 to Display Writer and Wordstar to Display Writer transfers. They're working on a version to work within the PC to translate Display Write II files into Wordstar files, or vice-versa.

Their primary market is large companies like Chrysler, GM, and GE that have Xerox 860's and are moving to IBM. He says the market currently offers programs to convert Display Writer to Display Write II, so they provide the first bridge from Xerox 860.

# DCODE

## Document Conversion for the IBM Displaywriter™

- **Complete** — all available text and codes are converted
- **Accurate** — converted documents look like originals
- **Automatic** — no manual clean-up after conversion
- **Editable** — converted documents can be edited or printed
- **Fast** — 15 seconds per page
- **Private** — conversions done directly on the Displaywriter
- **No Special Hardware** — software runs on the Displaywriter
- **Low Cost** — far less than other methods
- **Simple** — operators learn in 15 minutes

## Overview

The DCODE program saves Displaywriter operators endless hours of re-keyboarding or clean-up during document exchanges.

DCODE converts documents from other word processors (such as Xerox, WordStar or Wang) into standard Displaywriter format—automatically and without the need for manual clean-up.

After conversion, the documents can be edited or printed just as if they had originally been created with TextPak™ 4 on the Displaywriter.

In addition to converting all the text, DCODE converts all available control and formatting codes that specify margins, tabs, centering, underlines, subscripts, etc.

DCODE is simple and fast. Displaywriter operators can learn it in less than 15 minutes, and conversions take less than 15 seconds per page.

## Operation

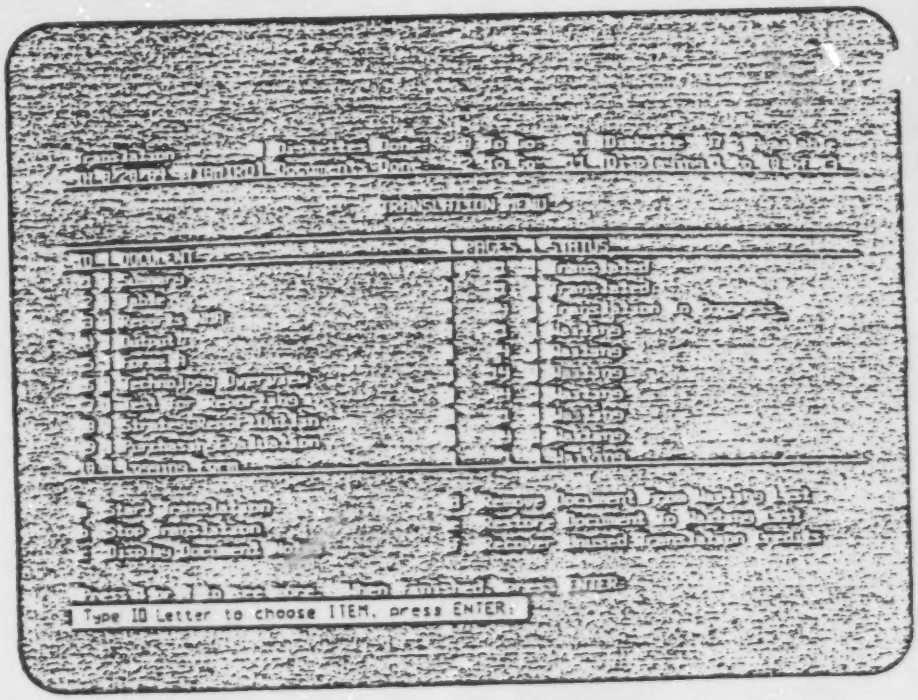
The DCODE program runs on the Displaywriter. Some diskettes (such as Xerox and WordStar) can be inserted directly into the Displaywriter for conversion. In other cases (such as Wang), documents are first transmitted over a communications line before conversion with DCODE.

DCODE is sold with an upper limit on the number of diskettes it can convert. After reaching this upper limit (which varies with the price paid), the program stops running. Each time DCODE is run, the number of diskettes to be converted is entered and deducted from the total number of conversions purchased.

To run DCODE, the Displaywriter is turned on, the DCODE program diskette is inserted, and the number of diskettes to be converted during that session is entered.

The DCODE program diskette is then removed and the two work diskettes are inserted; the diskette containing the non-Displaywriter documents goes in one slot, and a blank Displaywriter diskette goes in the other slot.

Then, the Translation Menu appears. The documents to be converted are listed in the middle of the screen, and their status is shown as "waiting" to be converted.




**The Translation Menu** — Status information is shown at the top. Documents to be converted are listed in the middle. Commands used to control DCODE are at the bottom.

The commands used to control DCODE are listed in the lower part of the Translation Menu.

When the "start" command is selected, DCODE begins converting all of the documents that are "waiting."

At any point the conversion can be stopped, notes (messages) regarding the conversion of a particular document can be displayed, documents can be removed from or restored to the "waiting" list, or unused conversion credits can be recovered for later use.

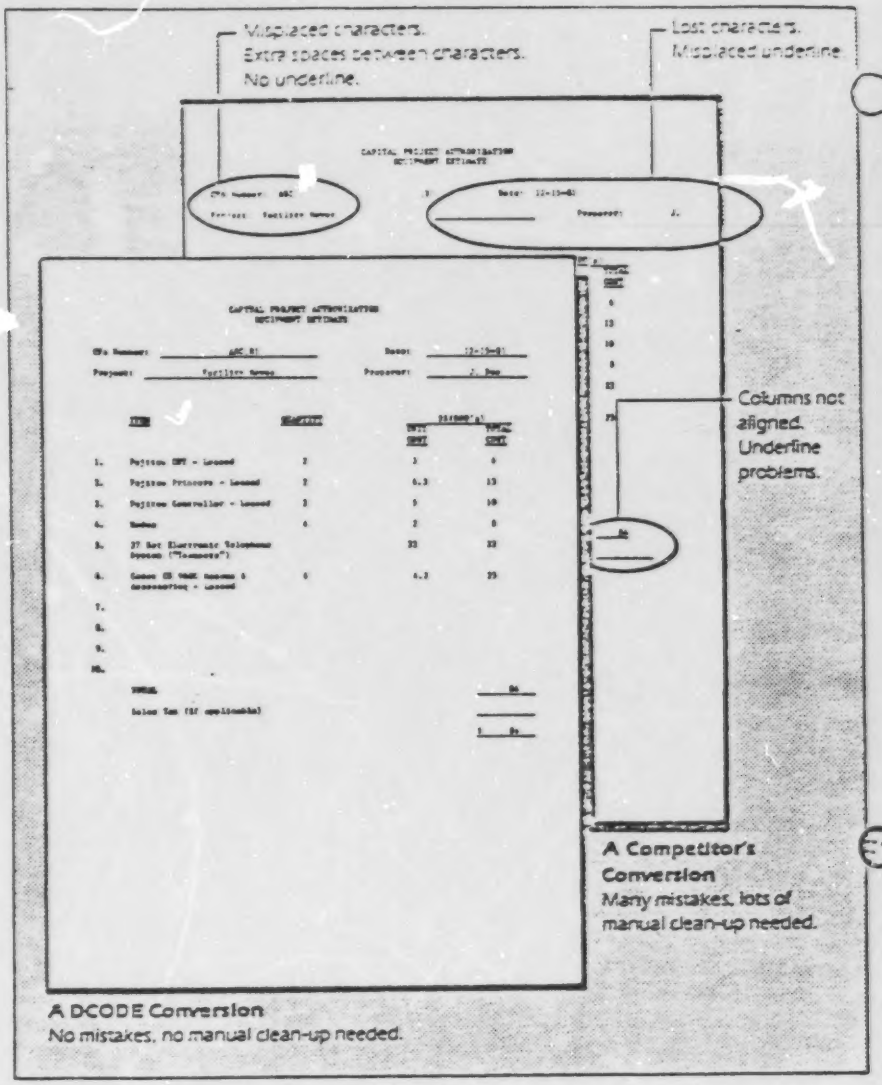
When the conversion is finished, TextPak can be used to edit or print the resulting documents. No manual clean-up is needed; all text and hidden format-control information available to DCODE and supported by the Displaywriter will be translated accurately.

## Competitive Comparison

The illustrations on this page compare a DCODE conversion of a Xerox 860 document with a leading competitor's conversion of the same document. The DCODE conversion is a complete, accurate translation of the original document whereas our competitor's conversion has many mistakes that require manual clean-up.

## Equipment Requirements

DCODE will run on any IBM Displaywriter with dual diskettes and memory of 256 K or more. Some versions also require communications.




## Versions

Program versions depend on the type of word processors involved and the direction of the conversion.

### Available Now:

| Model | Type and Direction |
|---|---|
| 10-30 | Xerox 860 to Displaywriter (Xerox 8" single-sided) |
| 10-31 | Xerox 820 to Displaywriter (Xerox 8" single-density) |
| 10-40 | WordStar to Displaywriter (WordStar 8" single-density CP/M) |

### Coming Soon:

Wang to Displaywriter

560 Waverly Street
Palo Alto, CA 94301
(415) 322-4555

Versions are subject to change without notice.

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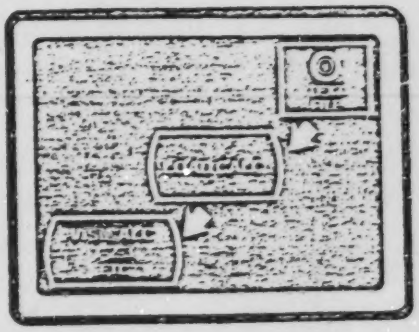
IBM, TextPak and DisplayWrite 2 are trademarks of International Business Machines Corporation. Xerox is a trademark of Xerox Corporation. Wang is a trademark of Wang Laboratories. WordStar is a trademark of MicroPro International Corporation. CP/M is a trademark of Digital Research, Inc.

(OR HOW TO MAKE THE MAINFRAME TO MICRO LINK REALLY WORK)

# LoadCalc™



Mainframe data to Micro Spreadsheets. LoadCalc bridges the gap between mainframe and personal computer. LoadCalc will convert any text file into a Spreadsheet file eliminating re-entry of data. LoadCalc will handle files downloaded from any mainframe with any terminal emulator.

With over 5,000 satisfied users, LoadCalc has become the standard text to Spreadsheet conversion program.

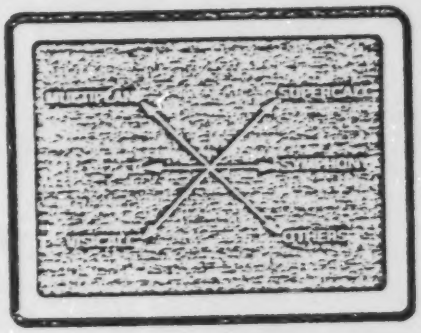
Quotes: *"LoadCalc makes the micro-mainframe connection worth the trouble"* —PC Week, June 12, 1984

*"This package is a must"* —ICP Business Software review, August/September, 1984

With LoadCalc 5.00 we have introduced pattern recognition techniques borrowed from robotics and weapons vision systems. LoadCalc 5.00 will select columns to fit your data automatically either for all your data or for sections you indicate. LoadCalc will convert a file of any size into Lotus, SuperCalc, MultiPlan, VisiCalc or DBase II.

LoadCalc is priced at $175.00 plus $3.00 postage in USA.

# ConvertaCalc™



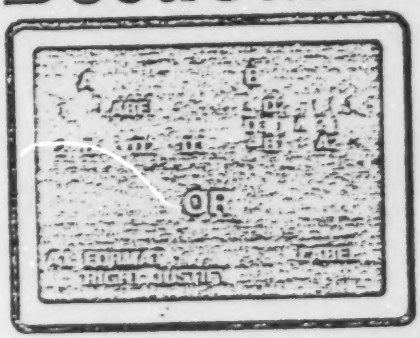
Have you ever wanted to convert one of your spreadsheet models into another format? Perhaps you just bought 1-2-3 and your models are in MultiPlan, or the field office only has SuperCalc. Perhaps you've given up the Apple III and its Advanced VisiCalc and bought an IBM. Perhaps you bought Symphony but your users still have Lotus 1-2-3.

It can take many, many unproductive hours to recreate a spreadsheet model in a new format. It can also introduce errors as you retype equations with many levels of brackets. Why should you waste time repeating a model you have already built and tested?

ConvertaCalc will read your model cell by cell and write out whatever format you desire. It has extensive validation and each function is checked to see that it is available in the output format.

ConvertaCalc is priced at $245.00 plus $3.00 postage in USA.

# DocuCalc™



Before you buy a spreadsheet auditing program, ask your CPA firm what they use. Chances are, if you use a major CPA firm, the answer will be DocuCalc. DocuCalc is in use at hundreds of CPA offices throughout the world.

DocuCalc is the first product to receive an excellent rating from *Absolute Reference*, the 1-2-3 newsletter.

Quote: *"DocuCalc receives rave reviews from 1-2-3 users. All the users we interviewed were enthusiastic about the ways DocuCalc helped them exploit 1-2-3's special features"*
—Absolute Reference, Volume 2, Number 1.

DocuCalc prints your Lotus 1-2-3, Symphony, VisiCalc or SuperCalc model in any of three grid arrangements showing your equations in full. Cell formats can also be shown as well as global details such as range names. DocuCalc works directly with your Lotus model eliminating the need to produce a formulea listing.

DocuCalc is priced at $95.00 plus $3.00 postage in USA.

Payment may be made by MasterCard, Visa or your company PO#.

All programs run on the IBM PC or XT, Wang PC, DEC Rainbow, TI Professional and most other MS-DOS machines.

**Micro Decision Systems**, P. O. Box 1392, Pittsburgh, PA 15230. Telephone: 412/854-4070

DIF, VisiCalc, Multiplan, SuperCalc, 1-2-3/Symphony and LoadCalc/DocuCalc/ConvertaCalc are trademarks of Software Arts, VisiCorp., Microsoft, Sorcim Corp., Lotus Dev. Corp. and Micro Decision Systems.

IBM 3270...

# Chapter 10. Programming Support

Here is a list of some of the operating systems, access methods, and products that support the IBM 3270 Information Display System. For details about them, contact your IBM marketing representative.

## Operating Systems

- Airlines Control Program (ACP)
- Disk Operating System/Virtual Storage Extended (DOS/VSE)
- Multiple Virtual Storage/Extended Architecture (MVS/XA)
- Multiple Virtual Storage/System Product (MVS/SP)
- Operating System/Virtual Storage 1 (OS/VS1)
- Small System Executive (SSX)
- Small System Executive/Virtual Storage Extended (VSE)
- Virtual Machine/System Product (VM/SP)

## Telecommunication Access Methods

- Advanced Communications Function/Virtual Telecommunications Access Method (ACF/VTAM) under DOS/VS, DOS/VSE, and OS/VS
- Advanced Communications Function/Telecommunications Access Method (ACF/TCAM) under OS/VS
- Advanced Communications Function/Virtual Telecommunications Access Method Entry (ACF/VTAME) under DOS/VSE
- Basic Telecommunications Access Method (BTAM) under OS, DOS, OS/VS, and DOS/VS
- Basic Telecommunications Access Method — Extended Support (BTAM-ES) under DOS/VSE
- Extended Telecommunications Modules (EXTM) feature of CICS/DOS/VS

Development Center

- Development Management System/CICS/VS (DMS/CICS/VS)
- Development Management System/Cross System Product (DMS/CSP)
- Entry Level Interactive Application System (ELIAS)
- IMS Application Development Facility II (IMSADF II)
- Screen Definition Facility/Customer Information Control System (SDF/CICS)

Office Systems

- Advanced Text Management System III (ATMS III)
- Document Composition Facility (DCF)
- Host Display View Facility (HDVF)
- Integrated Processing of Data and Text (IPDT)
- Professional Office System (PROFS)
- Storage Information Retrieval System (STAIRS)

Data Base Data Communication Systems

- CICS/DC Aids
  - CICS/VS Online Test/Debug II (OLTD II)
  - CICS Source Program Maintenance Online II (SPM II)
- Customer Information Control System/VS (CICS/VS)
- DB/DC Data Dictionary
- IMS/VS Aids
  - Batch Terminal Simulator
- Information Management System/VS Data Communications (IMS/VS-DC)

Interactive Programming Support

- Conversation Monitor System (CMS)
- Interactive System Productivity Facility (ISPF)
- Time Sharing Option (TSO)
- TSO Extensions (TSO/E)

# SRA Issues Self-Taught 'DisplayWrite2' Guide

CHICAGO—*Using IBM DisplayWrite2*, an interactive self-taught course, is available from Science Research Associates (SRA), the educational publishing subsidiary of IBM Corp.

Designed for secretaries and professional text processors, the 20-hour, two-volume course provides hands-on training for *DisplayWrite2* on the IBM PC.

The course is divided into 40-minute lessons, a vendor representative said.

The first volume of the course teaches how to create, print, revise, format and paginate simple documents.

The second volume concentrates on advanced aspects of *DisplayWrite2*, including math functions, text merge, spelling check, floppy-disk formatting, utilities and directories.

*Using IBM DisplayWrite 2* includes two handbooks, an administrative guide and four training disks.

## What You Get

The handbooks contain step-by-step directions for each function to prepare the student to perform the disk exercises given for each of the functions.

Once the course is completed, the handbooks serve as a reference guide.

The training floppy disks support the handbooks by providing on-line exercises and simulating the *DisplayWrite2* program.

*Using IBM DisplayWrite2* is priced at $250.

Quantity discounts are available on purchases of 25 or more courses.

A toll-free telephone number for ordering *Using IBM DisplayWrite2* is (800) IBM-2468.

SRA can be contacted at P.O. Box 5380, Chicago, IL 60680 (312) 984-7234. ■

# Micro Logic Corp. Deals C Language Reference Card

HACKENSACK, NJ—C Language programmers now can get information at a glance with Micro Logic Corp.'s "C LANGUAGE" reference card.

This double-sided, two-toned, 8½-by-11-



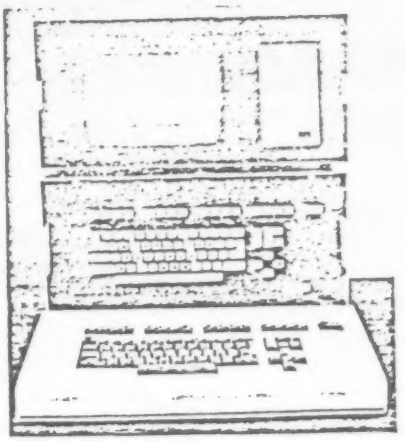
DATABASE MA

# Test System Evaluates Word Processing Skills

One of the first testing systems to categorize and evaluate word-processing skills was unveiled by Kelly Services, Inc. and Kee, Inc. More exacting than the familiar typing test, the Kelly Simulator Test for Word Processing Operators is the result of an alliance between the international temporary help firm and Kee, a developer of training systems for the aerospace and computer industries.

Using the simulator, the test can evaluate employees in overall word-processing capability, and skill levels on separate functions, such as inputting, formatting and editing, and knowledge of variable equipment. The simulator duplicates the keyboard functions of word processors from Wang, IBM and Lanier.

Score results are displayed on the CRT screen by function, showing time, errors and accuracy percentage. The operator must achieve a minimum proficiency rate in each required function before being certified and sent to a customer's office. An experienced operator, deficient or rusty in one or more functions, can receive refresher training on the simulator and take the test again. The system provides advanced tests for those experienced in statistics, editing and printing.



*Simulator test can be used on many word processors by attaching the appropriate keyboard and keyboard panel and inserting the corresponding disc.*

Like a word processor, the system includes a CRT screen and keyboard. An illuminated display panel interacts with the operator via lights and audio signals through three levels of instruction.

The prompting mode has the display panel leading the student through the course by lighting the correct keys in sequence.

The guiding mode has the operator selecting the proper keys without assistance from the simulator. If the operator makes an error, the correct-key lights on the display panel and the operator makes the correction.

The testing mode has an individual perform the exercises without assistance. If an error occurs, a beep is sounded. The error must be corrected, without help, before the operator can continue.

### Electronically Timed

At the end of a test, a comprehensive score indicates the speed and accuracy attained on all functions. Time is measured electronically from start to finish, and keystrokes are counted.

This self-paced, individualized training can be used as an adjunct to or as a substitute for classroom training and texts.

T. E. Adderly, president, Kelly Services, reported 98% customer satisfaction with the new method in test markets. "With the Kelly-designed word processing operator test on the Kee simulator, we can set and measure standards for word processing competence with a precision never before possible." (10)

*Introduction of simulator on which testing is conducted makes it possible for the first time to accurately measure and statistically evaluate an operator's skills.*

*FOR FURTHER INFORMATION WRITE: KEE, INC., 10759 TUCKER ST. (DO), BELTSVILLE, MD 20705, OR CALL (301) 937-1711.*

KEE
CORPORATED

IBM DISPLAYWRITER COURSE

| MODULE | DESCRIPTION | LENGTH |
|---|---|---|
| 1. | BASIC DISPLAYWRITER OPERATIONS<br>Menus, Creating documents, Wordwrap, Setting margins and tabs, Decimal tabs, Format symbols, Centering, Indenting, Page breaks, Printing, Cursor, FIND, Document index, Editing documents, Insert, Delete, Replace, Move, Copy, Global. | 4-6 hrs. |
| 2. | DISPLAYWRITER TIME SAVERS<br>Quick cursor moves, SCREEN UP and SCREEN DOWN keys, best FIND techniques, Menu bypass and short menu fillins, Highlighting shortcuts. | 2 hrs. |
| 3. | SPECIAL TYPING SITUATIONS<br>Required spaces, Underscore methods, Subscripts and Superscrips, Required backspace, Overprinting, Formulas, Overstrike editing. | 2 hrs. |
| 4. | LINE ENDINGS<br>Required and non-required hyphens, while inputting and editing, LINE ADJ function, end-of-line hyphen, slash and space problems. | 2 hrs. |
| 5. | PREPARING TO PRINT<br>Automatic Pagination, Hyphenation, Combined Hyphenation and Pagination with SPELL key, Spell check. | 2 hrs. |
| 6. | FORMAT CHANGES<br>Initial format setup, Alternate format and envelopes, Change Format within document, Making tables within document, Columns, Returning to previous format, Copying format changes, Editing format changes. | 3 hrs. |
| 7. | HEADERS, FOOTERS AND PAGE NUMBERS<br>Setting up Headers and Footers, including automatic page numbers, stopping, starting and revising headers, footers and page numbers within document. | 1 hr, |
| 8. | THE "GET" FUNCTION<br>GET function menu, GETting pages, GET with mismatched formats, GET format library, GET paragraph library. | 2 hrs. |
| 9. | PRINTING<br>The PRINT key: trial printing, Canceling a print job, Changing print order, Menu bypass printing, Print menu options. | 1 hr. |

KAYPRO CORPORATED

## CERTIFICATION TEST SCORES: IBM

| | | RIGHT | WRONG | ACCURACY | TIME |
|---|---|---|---|---|---|
| Inputting: | Text | | 9 | | 1:38 (0 WPM) (1 BKSP) |
| Text Formatting: | Margins & Tabs | 15 | 2 | 88% | |
| | Centering | 4 | 0 | 100% | |
| | Indent | 4 | 0 | 100% | |
| | Decimal Tab | 4 | 0 | 100% | |
| | | 27 | 2 | 93% | 3:07 |
| Text Editing: | Insert | 8 | 1 | 88% | |
| | Delete | 8 | 0 | 100% | |
| | Replace | 9 | 0 | 100% | |
| | Move | 6 | 0 | 100% | |
| | Copy | 6 | 0 | 100% | |
| | | 37 | 1 | 97% | 2:27 |
| Printing: | Print Document | 8 | 0 | 100% | |
| | Cancel Print Req. | 5 | 0 | 100% | |
| | | 13 | 0 | 100% | 0:44 |
| Totals: | | 77 | 3 | 96% | 6:18 |

# PRODUCT DATA

## KEYSWAPPER 1.4 GIVES YOU ULTIMATE KEYBOARD FLEXIBILITY AND TOTAL CONTROL WITH MACRO CAPABILITY.

Once in a great while, a new product comes along that, like knowledge, is limited only by the user's imagination. KEYSWAPPER™, for the IBM PC and XT, is just such a product.

Now you can have total keyboard control – change key functions, change keyboard configurations, use up to 40 MACROs, and do so much more. Everybody can benefit from KEYSWAPPER 1.4 – touch typists, word processor users, spreadsheet users, programmers, everybody!

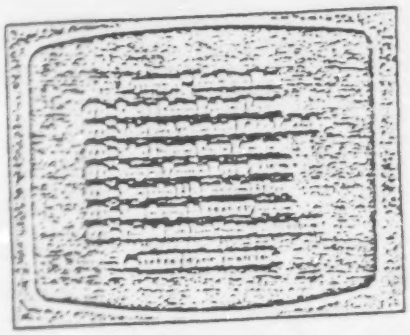
KEYSWAPPER is a keyboard software utility with MACRO (string commands) capability. The use of FUNCTION KEY MACROs eliminates the tedium of entering the same series of commands or strings over and over again. You can assign up to 40 MACROs in groups of 10 using <F1> to <F10>, <ALT> + <F1> to <F10>, <Ctrl> + <F1> to <F10>, and <Shift> + <F1> to <F10>.

With a single command, KEYSWAPPER gives you the choice of four different keyboard layouts. Choose from a standard "typewriter", the IBM PC, DVORAK, or your own customized keyboard layout.

You can, of course, move the location of individual key functions as you choose. For example, add a second ENTER key, move the CTRL key, reposition the SHIFT keys, even swap the cursor and function controls. The possibilities are almost endless!

Highly flexible and easy to use, KEYSWAPPER's installation and configuration are fully menu-driven with visual keyboard layouts (before and after any change). Optional features can be turned on and off at the command line. And KEYSWAPPER itself can be turned off without having to re-boot the system.

KEYSWAPPER works with virtually all applications software, protected or not, and has been tested successfully with 1-2-3, Wordstar, Visicalc, dBASE II, Supercalc, Volkswriter, Easywriter and many others. KEYSWAPPER is fully compatible with DOS 1.1 and 2.0 on both the IBM PC and XT.



**A must for word processors**

KEYSWAPPER is specially designed to make word processing faster and easier. Besides making the PC's keyboard more like a typewriter's – accomplished with a single command – KEYSWAPPER has a variety of other features that will be greatly appreciated:

- Gives audible feedback on the CAPSLOCK key so that it's status is known without having to guess.
- Has an automatic CAPSLOCK reset that is similar to a shiftlock reset on a typewriter.
- Creates keyboard macros that can replace frequently used commands or text phrases.

**A helping hand to spreadsheet users.**

If you work with spreadsheets, you'll appreciate what KEYSWAPPER can do for you:

- Gives you alternate cursor controls so you can have the numeric keypad AND preassigned cursor controls active at the same time. Use your right hand for the numeric keypad and your left for the cursor controls. Your alternate cursor controls can toggle on/off with the NUMLOCK key.
- Add or reposition keys to speed spreadsheet use. For example, you can replace the + key at the numeric keypad with a second ENTER key.
- Add a double zero (00) key to the numeric keypad. You may use the SCROLL LOCK key or any other key you choose.
- Gives audible feedback on the NUMLOCK key, letting you know if the numeric keypad is active.

**So easy to use KEYSWAPPER**

To install and configure KEYSWAPPER, just run the auxilliary program INSTALL.BAS. If you wish, you can set up multiple copies of KEYSWAPPER, each with different MACROs, different alternate cursor locations, and so forth.

The installation is fully menu-driven with visuals (see figure). You may change the location of the alternate cursors and change the pitch and duration of the audible CAPSLOCK/NUMLOCK beep now.

Using KEYSWAPPER is as simple as typing the command: KEYSWAP. Many of the optional features can be turned on from the command line. For example: KEYSWAP K,S,C,L (arguments are optional)

where K = which of 4 different keyboards
S = toggles audible beep on/off
C = use built-in (default) alternate cursors
L = use automatic CAPSLOCK reset

KEYSWAPPER can be toggled on/off anytime, even while another program is running. To make it even more convenient, you can make the KEYSWAP command part of your AUTOEXEC.BAT file so you can have KEYSWAPPER run automatically every time you boot up.

Ask about version 2.0 offering the most powerful MACRO capability available.

**KEYSWAPPER 1.4 .....$44.95 each**

Vertex systems

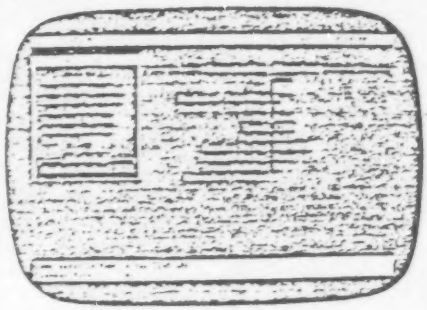
6022 W. Pico Blvd., #4
Los Angeles, CA 90035
(213) 938-0857



computer products

# NOW YOU CAN INTEGRATE COMMUNICATIONS WITH ANY IBM PC COMPATIBLE SOFTWARE.

Here's the first software that lets you add concurrent communications to your favorite programs including spreadsheets, data base, and word processing. You can also use Softerm PC™ to access information services, bulletin boards, electronic mail systems, and your company's computer.



## SOFTERM PC IS EASY TO USE.

Softerm PC lets you interrupt any program simply by pressing one key. You can then use disk utilities, print a file, dial a host computer, use terminal mode, or initiate a file transfer. You can even receive electronic mail from other systems while you work.

## SYSTEM REQUIREMENTS

IBM PC or Compatible
128 Kb Memory
1 Diskette (2 recommended)
Asynchronous Communications Adapter
Monochrome or Color Display
PC-DOS Version 2.00 or higher

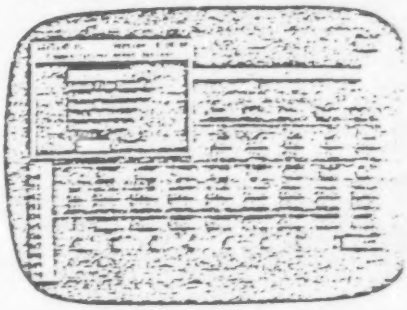
## GET COMPLETE EMULATIONS OF 24 TERMINALS.

Softerm PC is not limited to basic TTY terminal emulation. It includes *exact* emulations of 24 popular terminals and provides all keyboard and display functions. Also, both conversational and block modes are supported.

TTY Compatible
ADDS Regent 20
ADDS Regent 25
ADDS Regent 40
ADDS Regent 60
ADDS Viewpoint
Data General D200
Datapoint 3601
DEC VT52
DEC VT102
Hazeltine 1400/1410
Hazeltine 1500
Hazeltine 1520
Hewlett Packard 2622A
Honeywell VIP7205
Honeywell VIP7601
Honeywell VIP7803
IBM 3101 Model 10
IBM 3101 Model 20
Lear Siegler ADM-3A
Lear Siegler ADM-5
TeleVideo 910
TeleVideo 925
TeleVideo 950
User Defined

## SAVE TIME WITH MULTI-PORT OPERATION AND REAL-TIME SCHEDULING.

Softerm PC supports the concurrent operation of up to 4 communications ports and 3 printer ports through background processing queues. Now you can operate your system to its full potential by simultaneously using your available ports for printing or communications functions.



SEE LIST OF FEATURES ON BOTTOM OF BOX.